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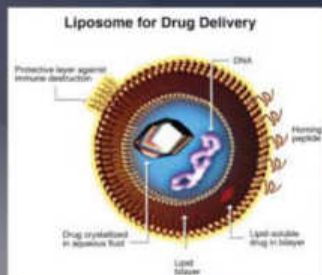
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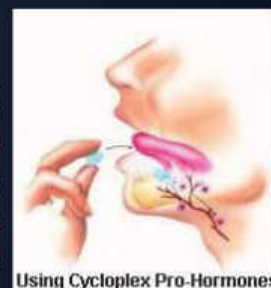
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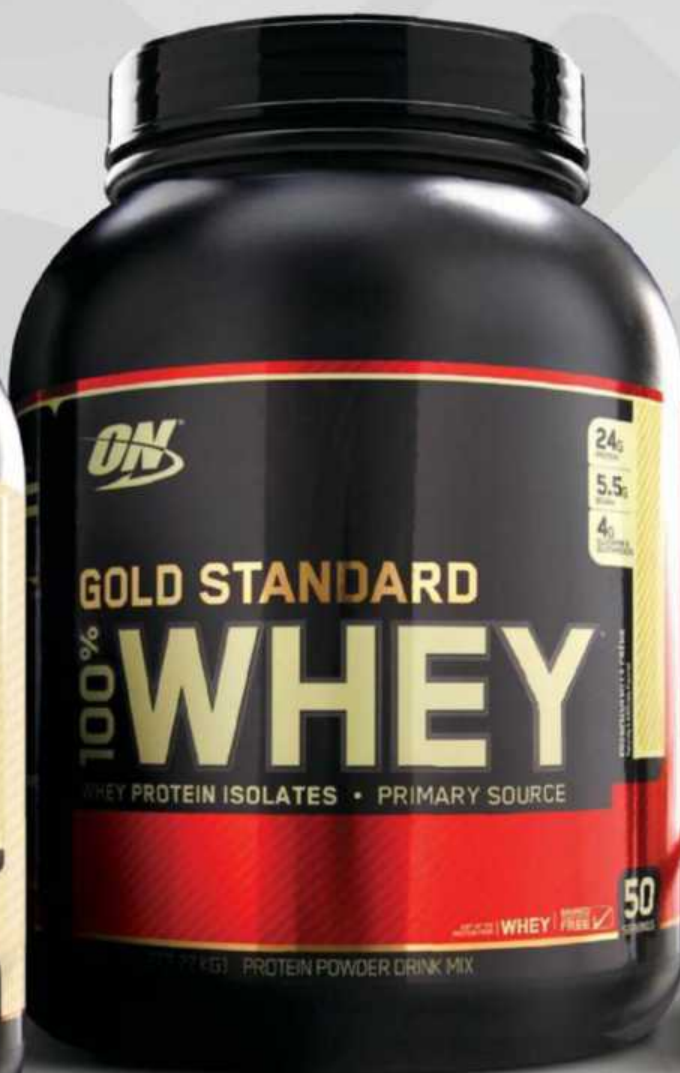
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A new clinical study demonstrated that hard training athletes supplementing with CARNIVOR Beef Protein Isolate gained an average of 7.7 lbs. of muscle mass in just 8 weeks, while increasing strength. Researchers gave test subjects 2 scoops of CARNIVOR BPI daily for 8 weeks while they exercised 5 days weekly. Athletes taking CARNIVOR BPI added an impressive 6.4% average increase in lean body mass. In contrast, the placebo group did not significantly improve their muscle mass from baseline.*

The study also showed that CARNIVOR BPI supplementation significantly increased lifting strength. Test subjects increased their average bench press strength by over 45 lbs. and added more than 90 lbs. to their deadlift over baseline.* These impressive clinical findings clearly validate the muscle and strength building power of CARNIVOR Beef Protein Isolate.

NICK "3D" TRIGILI
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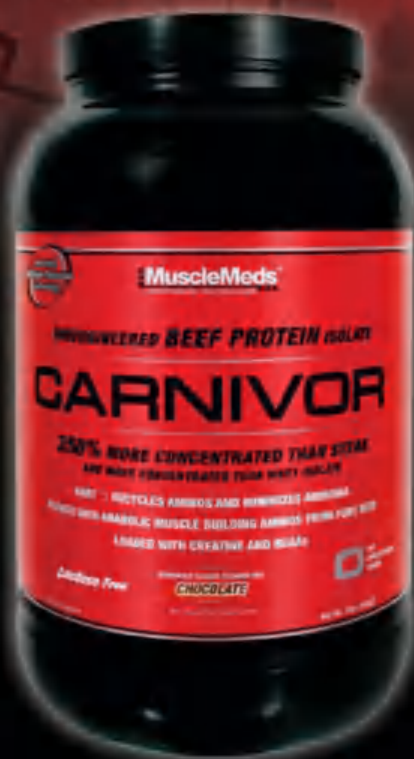
0g

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CARNIVOR is the world's first and #1 selling Beef Protein Isolate (BPI), delivering 23 grams of high quality pure beef protein in 10 delicious flavors. Thanks to advanced hydrolysis and isolation technologies, CARNIVOR is a 99% pure premium grade beef protein powder from USDA Inspected beef that's highly bioavailable and loaded with performance enhancing BCAAs and creatine. CARNIVOR'S exclusive BPI not only digests as fast as whey protein isolate, but is even more concentrated in muscle building amino acids. And with CARNIVOR, you get all the power of 100% beef with 0 fat, 0 cholesterol, 0 sugar, 0 lactose and 0 gluten. CARNIVOR is fortified with creatine, BCAAs and BCKAs for even more muscle building power. Don't be fooled by the other poorly formulated beef protein imitators. BEEF UP your muscles and get the results you want with CARNIVOR!

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*Sharp, et al., 2015 ISSN International Conference [Poster]. Muscle mass data based on male subjects. Lean body mass gains compared to baseline. Based on 2 scoops (46 grams protein) daily. Female subjects also experienced an increase in lean body mass.

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- Subjects **gained 5.3 lbs. of lean muscle mass!****
- Subjects **lost 2.9 lbs. of fat mass!****
- Subjects **gained 47% in bench press strength!****

**Based on results from an 8 week research study using Mediator® Phosphatidic Acid and resistance training conducted by Dr. Jacob Wilson at The University of Tampa, Tampa FL.

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People across America are achieving amazing results with MaxxTOR!



"My personal results were nothing less than outstanding as I lost 15.1 lbs of body fat (7.5% body fat) and gained 5.1 lbs of muscle in less than 8 weeks!"

Dr. Guillermo Escalante—Upland, CA
Adjunct Professor of Kinesiology, Cal State San Bernardino

"From the first time I started taking MaxxTOR I was hooked. After the first week, there was a noticeable improvement and it just kept getting better."

Alvin Cooper—Dunnigan, CA



"I gained 8.5 lbs. of lean muscle and lost 11.7% body fat. When I saw the results of my In Body scans after only 8 weeks of using MaxxTOR I was floored."

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EDITOR'S LETTER

BY STEVE BLECHMAN, Publisher and Editor-in-Chief

DEXTER JACKSON IS 'THE BLADE' BODYBUILDING'S NEXT GIFT?



**COULD DEXTER BE THE
GIFT THAT KEEPS ON
GIVING, AND THE NEXT
MR. OLYMPIA?**

Being the number-one bodybuilder in the world is an achievement that commands respect from fans and fellow competitors alike. The reigning Mr. Olympia, five-time champion Phil Heath, is nicknamed "The Gift" because of the natural abilities that have helped to propel his career. Phil is a tremendous athlete and competitor, but one of the notable events of the 2015 Mr. Olympia contest was how close it was. In fact, The Gift almost got his ass handed to him by a 45-year-old grandfather, Dexter Jackson. With more longevity in the sport than Phil—Dexter has been competing in the IFBB for 17 seasons—could Dexter be the gift that keeps on giving, and the next Mr. Olympia?

Dexter's sterling track record of consistency and his future plans are explored in "Dexter Jackson: The Ageless Wonder!" an exclusive interview by Ron Harris on page 90. At an age where nearly all other pro bodybuilders have either long since rode off into the sunset or are hanging on as shadows of their former selves who don't realize their time is gone, Dexter Jackson is still kicking ass and taking names.

Getting huge is the name of the game, but where do you start if you want to get bigger, leaner and meaner? Check out "MD's Ultimate 2016 Mass Program – Your Complete Training and Diet Guide!" on page 100. You can accomplish a lot and make very noticeable changes to your physique in a year, especially if you are motivated, focused, have a clear plan and stick to it.

Jose Raymond is one of the top pros in the 212 division, with a thick and gnarly total package that won the 2015 Arnold Classic 212. In "Jose Raymond's Top 10 Arm Exercises – Building Massive Bi's and Tri's With The Boston Mass" on page 110, The Boston Mass tells us how he blasts his 21-inch arms.

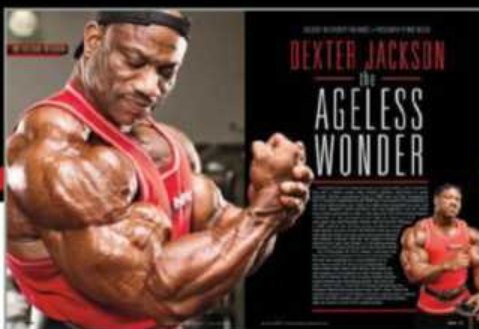
Two thousand fifteen was the year that Arnold Schwarzenegger proved, yet again, that his voice has become as powerful as the physique that dominated the '70s. The IFBB Pro League gave away more than \$3.4 million in prize money in 2015, more than ever before. Dexter Jackson became one of the most universally celebrated bodybuilders on the planet, and when the Mr. Olympia contest came to Vegas, Kai Greene was AWOL. Dan Solomon looks back at the industry news in "Biggest Bodybuilding Stories of 2015" on page 120.

Muscular Development is your number-one source for building muscle, and for the latest research and best science to enable you to train smart and effectively. This month, our team of physicians, industry experts and research scientists has compiled the best bodybuilding science of 2015! "The Year in

Review: Highlighting the Most Significant Research of the year" is the theme for Fat Attack (page 72), Nutrition Performance (page 76), Supplement Performance (page 80), Muscle Growth Update (page 84), The M.A.X. Muscle Plan (page 88), Testosterone (page 130) and Bodybuilding Science (page 134). Check out the best research from 2015 from the best in the business.

IFBB Bikini Pro Michelle Lewin has become one of the biggest stars of the fitness industry, with a mind-blowing social media following that includes over 6 million Facebook likes. The internationally renowned fitness model and icon has gone from being the girl next door in Venezuela to Miss Worldwide: recognized around the globe for her stunning physical charms and extremely down-to-earth personality. See lots more of Michelle in this month's Major Distraction on page 124.

The rest of the book is packed to the binder as usual— making MD your one-stop, most authoritative source for optimizing muscular development with the latest cutting-edge research on training, nutrition, fat loss, performance-enhancing drugs, muscle growth and bodybuilding science—and exclusive information from the industry experts, insiders and bodybuilding legends who make it all happen. See you next month!



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A black and white photograph of a muscular man, Jerry Pritchett, lifting a large, dark, spherical weight with both hands. The weight has the number '274' written on it in red. He is wearing a dark t-shirt with a logo that says 'ALR INDUSTRIE' and a pair of wristbands. The background is a vibrant orange and red with black diagonal stripes radiating from the center. The text 'WHEN BIG...' is in large, bold, black letters with a white outline at the top.

WHEN BIG...

JERRY PRITCHETT

6'4" / 364 LBS

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VOL.53, NUMBER 1, JANUARY 2016

CONTENTS

features
01.16



100 MD'S ULTIMATE 2016 MASS PROGRAM Your Complete Training and Diet Guide! By Ron Harris



120 BIGGEST BODYBUILDING STORIES OF 2015 By Dan Solomon

90 DEXTER JACKSON:
THE AGELESS WONDER!
Exclusive Interview by Ron Harris

124 MAJOR DISTRACTION:
MICHELLE LEWIN
*Internationally Renowned
Fitness Model and Icon
Photography by Per Bernal*

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110

JOSE RAYMOND'S TOP 10 ARM EXERCISES

Building Massive Bi's and Tri's With The Boston Mass
By Ron Harris



departments

THE WEIGHT ROOM

- 25 MD PEOPLE
- 30 HOW I SEE IT!
By Kevin Levrone, Shawn Ray and Dorian Yates
- 34 TRUE BRIT By Peter McGough
- 37 BODYBUILDING MECCA
By Bev Francis and Steve Weinberger
- 38 THE VOICE By Dan Solomon
- 39 CHICK CHAT By Bob Cicherillo
- 42 DLB By Dana Linn Bailey **NEW!**
- 46 GLOBAL BODYBUILDING UPDATE
By Adina Zanolli
- 48 MUSCULARDEVELOPMENT.COM
By Adina Zanolli

TRAINING

- 88 THE M.A.X. MUSCLE PLAN
The Year in Review: Highlighting the Most Significant Research of 2015 By Brad Schoenfeld, Ph.D., CSCS, FNCSA
- 144 MD TRAINING CAMP With Dexter Jackson, Dennis Wolf, Branch Warren and Dallas McCarver
- 150 THE GIFTED ONE – PHIL HEATH
By Ron Harris
- 151 A CUT ABOVE By 4-Time Mr. Olympia, Jay Cutler
- 152 THE ANIMAL KINGDOM
By 8-Time Mr. Olympia, Lee Haney
- 153 ARNOLD'S CORNER By Ron Harris
- 154 HARDCORE Q&A
By 8-Time Mr. Olympia, Ronnie Coleman
- 158 BLOOD AND GUTS By Dorian Yates
- 159 THE BLADE By Dexter Jackson
- 160 HARDCORE MUSCLE FORM AND FUNCTION By Stephen E. Alway, Ph.D., FACSM
- 164 TRAINERS OF CHAMPIONS By Master Trainer Charles Glass, IFBB Pro Guru George Farah, The Pro Creator Hany Rambod



NUTRITION & PERFORMANCE

- 50 RESEARCH: TRAINING
By Steve Blechman & Thomas Fahey, Ed.D.
- 58 RESEARCH: NUTRITION
By Steve Blechman & Thomas Fahey, Ed.D.
- 64 RESEARCH: SUPPLEMENTS
By Steve Blechman & Thomas Fahey, Ed.D.
- 76 NUTRITION PERFORMANCE The Year in Review: Highlighting the Most Significant Research of 2015 By Michael J. Rudolph, Ph.D.
- 80 SUPPLEMENT PERFORMANCE The Year in Review: Highlighting the Most Significant Research of 2015 By Victor R. Prisk, M.D.
- 142 MUSCLETECH RESEARCH REPORT
By Team MuscleTech®

FAT LOSS

- 54 RESEARCH: FAT LOSS
By Steve Blechman & Thomas Fahey, Ed.D.
- 72 FAT ATTACK The Year in Review: Highlighting the Most Significant Research of 2015 By Daniel Gwartney, M.D.

DRUGS

- 62 RESEARCH: DRUGS
By Steve Blechman & Thomas Fahey, Ed.D.
- 130 TESTOSTERONE The Year in Review: Highlighting the Most Significant Research of 2015 By Daniel Gwartney, M.D.
- 138 ANABOLIC RESEARCH UPDATE
By William Llewellyn
- 162 BUSTED! LEGAL Q&A
By Rick Collins, JD, CSCS

HEALTH & PERFORMANCE

- 60 RESEARCH: HEALTH & PERFORMANCE By Steve Blechman & Thomas Fahey, Ed.D.
- 68 RESEARCH: SEX
By Steve Blechman & Thomas Fahey, Ed.D.
- 84 MUSCLE GROWTH UPDATE The Year in Review: Highlighting the Most Significant Research of 2015 By Michael J. Rudolph, Ph.D.
- 134 BODYBUILDING SCIENCE The Year in Review: Highlighting the Most Significant Research of 2015 By Michael J. Rudolph, Ph.D.



ON THE COVER: DEXTER JACKSON
PHOTO BY MICHAEL NEVEUX

INSIDE STACK

- 12 EDITOR'S LETTER
By Steve Blechman
- 168 MARKETPLACE By Angela Theresa Frizalone & Manda Machado



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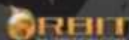


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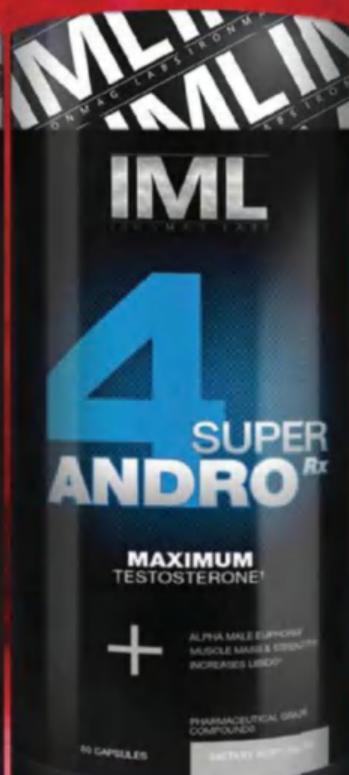
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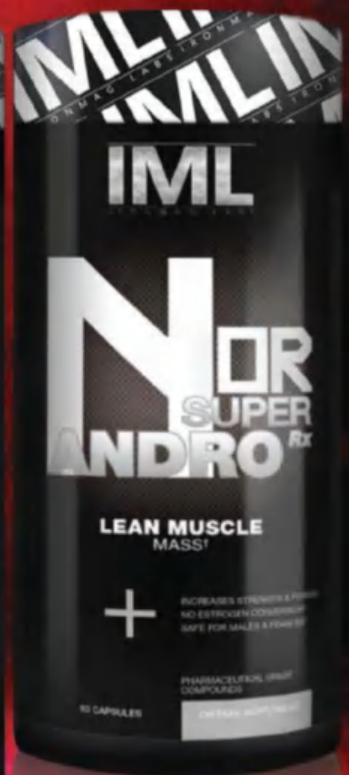
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JANUARY 2016

NEWS & VIEWS
FROM THE WORLD
OF BODYBUILDING

EIGHT ROOM



CHICK CHAT

BY BOB CICHERILLO

"NO ONE IS EVEN
CLOSE AT THIS
POINT AND TIME."

THE VOICE

BY DAN SOLOMON
"IT HAS NEVER SEEMED
MORE POSSIBLE"



CAN PHIL BE BEATEN?

POINT / COUNTERPOINT
THE GREAT DEBATE

SEE PG.
38-39

26

MD PEOPLE

2015 EVLS PRAGUE PRO
PHOTOGRAPHY BY ADINA ZANOLI

28

**BODYBUILDING
MECCA**

BY BEV FRANCIS AND
STEVE WEINBERGER

30

HOW I SEE IT

PHIL HEATH: ONE OF THE GREATEST?
BY SHAWN RAY, DORIAN YATES
AND KEVIN LEVRONE

34

TRUE BRIT

WHAT A YEAR IT WAS
A VERY PERSONAL AND RANDOM
REVIEW OF 2015
BY PETER MCGOUGH

42

DLB

ADVENTURE TOUR WRAP-UP AND
PLANS FOR 2016
BY DANA LINN BAILEY

46

**GLOBAL
BODYBUILDING
UPDATE**

BY ADINA ZANOLI

48

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BY ADINA ZANOLI



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HOW I SEE IT!

WITH **SHAWN RAY, DORIAN YATES AND KEVIN LEVRONE**

Muscular Development is proud to bring you “How I See It,” featuring three IFBB Hall of Fame bodybuilders, and legends of the industry that we are honored to have on Team MD. Between Shawn Ray and Kevin Levrone, they have a total of six runner-up finishes at the Mr. Olympia, and Dorian Yates won the Mr. Olympia title six consecutive times.



PHIL HEATH: ONE OF THE **GREATEST?**

WITH FIVE MR. OLYMPIA WINS IN A ROW, DO YOU FEEL PHIL HEATH IS DESTINED TO GO DOWN AS ONE OF THE GREATEST OLYMPIA CHAMPS OF ALL TIME? SO FAR ONLY LEE HANEY, RONNIE, DORIAN AND ARNOLD HAVE MORE TITLES. SOME FEEL THE CURRENT ERA ISN'T AS COMPETITIVE AS SOME PREVIOUS ERAS. DO YOU AGREE OR DISAGREE, AND DOES THIS AFFECT PHIL'S STANDING AS AN ALL-TIME GREAT?

SHAWN RAY

Since Phil won his first pro show, the Shawn Ray Colorado Pro in 2006, I feel that he has been the best bodybuilder competing in the IFBB. Since then, all Phil has done was improve beyond the level of his competitors, at a steady pace. That said, it's difficult to mention his name in the same breath as Dorian, Ronnie and Lee because they all competed in different eras. The depth of competition was much greater for those three legendary bodybuilders. They were challenged by Hall of Fame-caliber

athletes, whereas Phil is basically unchallenged by some “good” bodybuilders.

When I look at what Phil has done and the manner in which he is doing it, I can see a couple or even a few more Sandow trophies in his future, provided a few things change. Most importantly, he needs to emphasize refining and not building his physique at this stage of his career. Phil has all the necessary ingredients to hold his chief rivals at bay, based on age alone. However, if he continues to add more mass to his frame, it will distort and bring about off-balance in an otherwise perfectly sculpted physique.

Phil is at the age where he can dial it back a bit on the pound-

age, off-season weight and even his contest weight. His body could use a much-needed rest, and his emphasis should be on training closer to his contest weight year-round. At this stage of Phil's career, his muscles are naturally matured and ready for a “shock treatment,” something different from the norm. If he continues to do the same things he has done in the past, we can expect a further departure from what we fell in love with—and see only a shadow (no pun intended, Dorian) of what Phil brought to the Olympia stage back in 2011.

Phil is not perfect. The better he gets, the more the judges and fans expect from him. Is his body maxed-out? I say yes with regard to size. Can he improve and bring something different and special to the stage in 2016? Yes! He needs to take a page out of eight-time Mr. Olympia Ronnie Coleman's book in 2001, when he entered the Arnold Classic and won with a perfectly athletic streamlined physique—at arguably his lightest bodyweight of 243, prior to winning the 2001 Mr. Olympia again.

I can see Phil tying Dorian Yates' record next year, based on the depth of field or lack thereof. However, winning number seven and tying Arnold Schwarzenegger in 2017 will be a challenge for Phil. So many things happen on the path of life, that predicting one year at a time can be easy, but two or three years down the road is virtually impossible.

Should Phil stay hungry, active and injury free, I believe he has the best shot of anyone to win number seven. Guys like

Big Remy, and the youth and ambition of Justin Compton and Dallas McCarver, while not really a major factor today, can potentially wreak havoc in two to three years from now—just as Jay Cutler did before Phil, and as Phil has done since Jay. As for the other competitors Phil is up against, I only see two guys with potential Hall-of-Fame pedigree, Dexter Jackson and Kai Greene. The others are pace cars on Phil's racetrack.

Twitter: @sugarshawnray

“IT'S DIFFICULT TO MENTION HIS NAME IN THE SAME BREATH AS DORIAN, RONNIE AND LEE BECAUSE THEY ALL COMPETED IN DIFFERENT ERAS. THE DEPTH OF COMPETITION WAS MUCH GREATER FOR THOSE THREE LEGENDARY BODYBUILDERS.”

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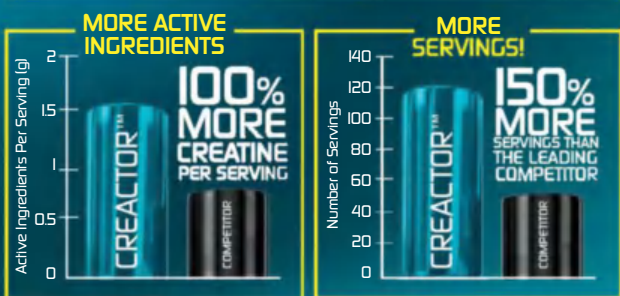
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"MANY FANS DON'T VIEW PHIL AS ONE OF THE GREATS BECAUSE THE STANDARD OF COMPETITION ISN'T AS GOOD TODAY AS IT HAS BEEN IN THE PAST."—DORIAN YATES

DORIAN YATES

In any sport, you're only as good as the people you're beating as a champion. Take Muhammad Ali, whom many consider to be the greatest world heavyweight boxing champion of all time. It wasn't so much due to any particular attributes Ali had—it was because he faced off against men like Joe Frazier, Ken Norton, George Foreman and Leon Spinks and was able to beat them all. Each of those men was an outstanding champion in his own right, and each would have easily defeated world champions from previous and future eras. I'd have to say that many fans don't view Phil as one of the greats because the standard of competition isn't as good today as it has been in the past. References are often made to Olympia lineups of 10-20 years ago as being deeper and more competitive. Some feel that Phil wouldn't be able to beat previous champions from those years.

Like any sport, bodybuilding should always evolve as the years go by. I don't feel that it has. You can argue that Phil did beat the man who was winning prior to him, Jay Cutler. But could he have beaten Ronnie Coleman in his prime? Few seem to think he could. I won't comment on how he would have fared against me, except to say that I think a couple of the guys who I was beating in my six years as the champion, men like Flex Wheeler and Kevin Levrone, for instance, would have given Phil a real run and probably would have come out on top.

Getting a little deeper into the issue of eras and how the sport should be evolving, there is no argument that a champion from 1995 would beat a champion from 1975. Standards changed quite a bit in those 20 years with regard to overall mass, development of the legs and back, and condition. I don't see that a similar progression has taken place from 1995 to 2015. And though a 1975 champion would not beat a 1995 champ, it's quite likely that a 1995 champion could beat

one from 2015. Perhaps we reached the peak of development some time ago, a point of critical mass where further improvement just isn't possible?

Physiques have gotten bigger over the last couple of decades, but to most eyes they haven't gotten better. That's probably why we are now seeing the rise in participation and popularity of new categories like MPD. None of this should necessarily be taken as a reflection on Phil Heath. He is the best bodybuilder in the sport today. Whether he will go down as one of the best ever, I'm not sure.

Facebook: Dorian Yates

KEVIN LEVRONE

Even with five Mr. Olympia titles under his belt, I think it's too early to say right now whether or not Phil will be considered one of the all-time greats. The only thing that would definitely give him that status is if he is able to win nine titles, and beat the current record of eight wins held by Lee Haney and Ronnie Coleman. If he accomplishes that, he will go down in history as the man who won the most Mr. Olympia titles. Unfortunately, I don't see him being considered among the all-time best, based on whom he's beaten. Aside from Kai, he's had very little competition in the form of other men who were big, complete and got into great condition. If you look at Lee Haney, Dorian Yates and Ronnie Coleman, they all had deeper lineups to fend off to continue holding on to their titles, year after year. But like I said, if Phil can win nine titles, he cements his place in the sport's history and everyone will have to respect that.

Can Phil win four more years in a row, though? Four years is a long time, and he will be almost 40 by then. The body can change a lot between 35 and

40. Lee Haney was done by age 31. Dorian retired at 33. Ronnie won his last Olympia at 41, but he got a little later start than the other two. Phil is still in his prime, but I think he might be nearing the end of his prime. Unless he's been making mistakes with his prep these last two years now, he does seem to be starting to fade a little bit from his first couple of wins when he was just incredible. I really thought he was going to be at his best ever or at least equal to his best this time, because of the way he was talking and how he was determined to shut up all the haters and the critics. I guess we will know for sure if his body is starting to fade on him when we see him next September.

What I really see affecting Phil's legacy is that he's had such little real competition. Aside from Kai, nobody is pushing him. And Kai didn't even show up to compete in 2015! When you know you can win easy and don't even have to be near 100 percent to hold on to your title, you get lazy.

You know what would be interesting? I'd love to see Phil compete with us back in the '90s. He's an excellent bodybuilder and no doubt he would hold his own. But he would not dominate the sport the way he does now. If he showed up off his best condition, he would have had guys like me, Dorian, Flex, Shawn, Ronnie and Chris Cormier who would have been right there to beat him. And even at his best, could he have beaten all of us at our bests? Obviously, we'll never know.

Listen, I am a fan of Phil Heath's physique and I do think he's an amazing champion. It's not his fault that there aren't many guys out there during his reign so far who could really push him hard and make him truly battle to stay on top. Maybe we will begin seeing that as some of these newer, younger guys improve and start challenging him. Or maybe like I said, he will go on to set a new record of nine Mr. Olympia titles before he retires. Time will tell. ■

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"THE ONLY THING THAT WOULD DEFINITELY GIVE HIM THAT STATUS IS IF HE IS ABLE TO WIN NINE TITLES, AND BEAT THE CURRENT RECORD OF EIGHT WINS HELD BY LEE HANEY AND RONNIE COLEMAN."—KEVIN LEVRONE

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WITH **PETER MCGOUGH**

WHAT A YEAR IT WAS A VERY PERSONAL AND RANDOM REVIEW OF 2015



ANOTHER PREGNANT PAUSE

At March's Arnold Classic, several competitors of the 13-man field sported swollen midsections, prompting recollection of the 2013 event when the same problem arose.

WHAT DID THEY CALL THE NEW ARRIVAL?

At that Arnold Classic, Roelly Winklaar sported a really swell midsection, looking more like Roelly-Poly. A week later in Australia, it had disappeared.

THE FULL MONTY

Will 21-year-old sensation Cody Montgomery (hot off his overall win at the 2015 USA Championships) come in full and ripped in his pro debut at the 2016 Arnold Classic in Columbus?



Classics, six Mr. Olympias, World Pro Championships and Mr. America contests. And indeed it is the place Arnold Schwarzenegger and Jim Lorimer first met in 1970, at that year's World Pro Championships. Of the 13 Mr. Olympias, only Larry Scott and Dorian Yates never competed at this venue.

CALM MIND CIRCLE

Say what? The enigmatic Cedric McMillan continues on his individual career path, competing four times in 2015 and then withdrawing from the Mr. Olympia just before prejudging. So what's CALM MIND CIRCLE mean? It's an anagram of Cedric McMillan—a message in there somewhere.

THE DALLAS WOWBOY

In his pro debut, 24-year-old Dallas McCarver took the top spot at the California Pro Championships last May, and then took 13th at the Olympia. With his frame, drive and intelligence, this young man will only improve in the next few years.

PROVING THAT BODYBUILDING IS INDEED AN ILLUSION

Kai Greene disappeared from the 2015 Olympia lineup.

BIG RAMYFICATIONS IN 2016?

In finishing second at October's Prague Pro contest (in the process, beating Dennis Wolf and Shawn Rhoden for the first time), is Big Ramy setting the scene for the leap forward we have been speculating about since he made his sensational pro debut back in 2013?

HIGH-FIVE IN 2016?

Having won the last four 212 Olympia titles, Flex Lewis is fast carving out a dynasty and aims to make it five in 2016. However, as he's sort of maxed-out at the 212-pound limit, he may have a stab at an open contest in 2017.

STRAIGHT OUTTA COMPTON

Justin Compton, after coming in too heavy at the 2015 Arnold Classic and finishing third, promises not to make the same mistake twice when returning to Columbus action next March.

WARREN WARPATH

Despite his many critics, Branch Warren battles on with grit and determination and continues to place highly.

END OF HALL-OF-FAME'S HAUL

Perhaps bodybuilding's most hallowed venue, the Veterans Memorial Hall in Columbus, did not stage the 2015 Arnold Classic that was launched at said hall in 1989. The hall was pulled down to make way for an apartment complex. The hall staged 26 Arnold



MR. SATURDAY NIGHT

A pattern has emerged in the wake of Phil Heath's five Olympia victories in that on three occasions (2012, 2014 and 2015), he has been much better at the Saturday night finals than at Friday's prejudging. In 2016 he promises to be both Mr. Friday and Saturday night.

ARNOLD AND THE ELEPHANT IN THE ROOM

At his annual Sunday morning seminar at the conclusion of the 2015 Arnold Classic, Arnold

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QUOTE OF THE OLYMPIA PRESS CONFERENCE

“HE CAN SIGN HIS NAME AS MR. OLYMPIA ON POSTERS THESE PAST FEW YEARS BUT HE CAN’T SIGN A CONTRACT?”

—PHIL HEATH COMMENTING ON KAI GREENE’S WILL-HE, WON’T-HE APPROACH TO THE 2015 OLYMPIA.

Schwarzenegger demanded change in the judging of bodybuilding contests. He said, “We have to make sure we are rewarding the right guys because if you reward the right guys, then everyone will start training to have a beautiful physique.” The comments caused more fallout than Rosie O’Donnell and Chris Christie fighting for space in a single bed.

READ ‘EM, THEN DON’T WEEP

In my online report of the 2015 USA Championships, the headline read, “The Worst Ever.” That was a semi-scientific survey to see if everybody would actually read the full article that contradicted the headline. As predicted, many didn’t read it and castigated me for the “worst ever” blurb.

SHE’S STILL DELISH

The first-ever Ms. Olympia, Rachel McLish, turned a fabulous 60 years of age last June 21 and still looks totally “Delish,” the nickname conferred on her by iconic bodybuilding writer Rick Wayne.

THE MS. O MISSED

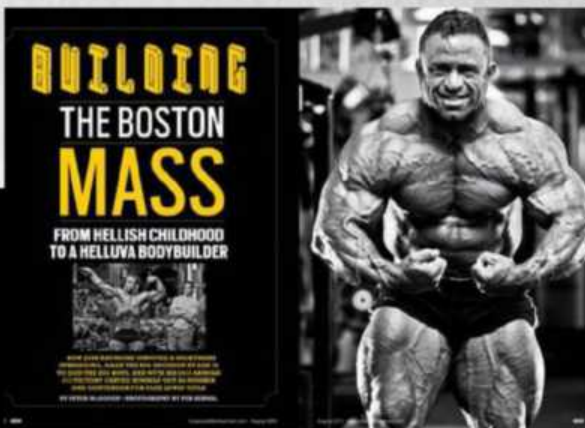
Sadly, 2015 was the first year that the Ms. Olympia contest did not take place since its 1980 inception. However, long-time supporters of women’s bodybuilding, Jake and Kristal Wood, formulated the 2015 IFBB Wings of Strength Rising Phoenix World Championships that was staged in San Antonio last August 22, with \$100,000 in prize money up for grabs. Margie Martin took home the 50 grand first-place check.

HURRAY FOR JOSE

In a few decades in this business, I’ve never written a story as inspirational as the one detailing Joe Raymond and his brother Tito’s rise from abject poverty to bodybuilding success that was published in our August issue. If you missed it, Google “The Jose Raymond Story, Parts 1 and 2.”

**MAN OF THE YEAR: DEXTER JACKSON**

Quite simply, he has amassed a fabulous bodybuilding resumé in 17 seasons as a pro. In winning the Prague Pro back in October, his pro victories now total 24—only one behind record-holder Ronnie Coleman and it was Dexter’s 77th IFBB contest, which is more than any other person. Milos Sarcev and Chris Cormier are next on that league, with 72 contests each.

**WHAT DO SPICY CHILI AND MR. OLYMPIAS HAVE IN COMMON?**

They have a habit of repeating. Of the 13 Mr. Olympias, 10 (Larry Scott, Sergio Oliva, Arnold Schwarzenegger, Franco Columbu, Frank Zane, Lee Haney, Dorian Yates, Ronnie Coleman, Jay Cutler and Phil Heath) were repeat champs. Only three (Chris Dickerson, Samir Bannout, Dexter Jackson) were not. In can be argued that Columbu was not a “repeat champ” in maybe the strictest interpretation of the phrase, as his two victories were 1976 and 1981, so he didn’t repeat in consecutive years.

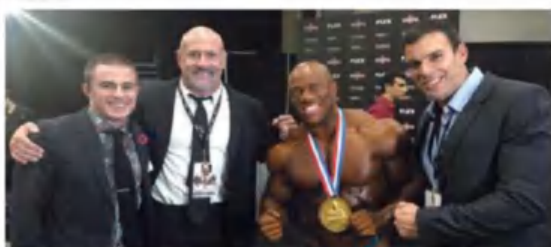
ONE FOR THE AGES

We ran a story online entitled, “Of the 13 Mr. Olympias, Which One Would You Most Want to Look Like?” Arnold Schwarzenegger came out on top with 27 percent of the vote, with runner-up Frank Zane receiving 18 percent. Interesting that in this day of all-out mass, over 50 percent of the punters voted for two guys who haven’t competed in over 30 years.

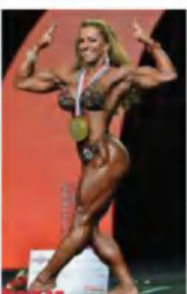
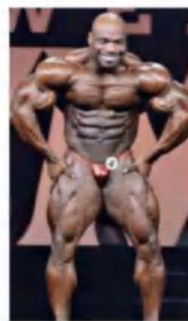
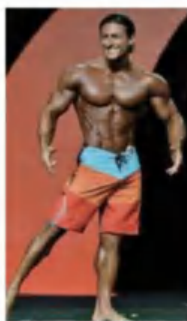
ONES TO WATCH IN 2016

Maxx Charles, Cody Montgomery, Juan Morel, Jon De La Rosa, Dallas McCarver and William Bonac. ■

EAST COAST MECCA NEWS



September is when all the months of hard work for the East Coast Mecca legends come to fruition at the Olympia Weekend. In 2015, our very own Juliana Malacarne won her second Women's Physique Showdown and Sadik Hadzovic came in second in the Men's Physique Showdown. On the Mr. Olympia stage, Juan Morel came in 11th while Maxx Charles came in 12th. Following the Olympia, head judge Steve Weinberger headed overseas to judge the IFBB Arnold Classic Europe and IFBB Prague Pro. Here are some sights from not only around the gym, but also the Olympia and abroad!



UPCOMING CONTEST SCHEDULE

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MAY 21, 2016: IFBB New York Pro (Teaneck, NJ) **TICKET SALES—**
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JULY 1-2 2016: NPC Universe-IFBB Pro Qualifier **ENTRY FORMS AND TICKET SALES—**
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THE VOICE

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HAS PHIL BECOME POINT BEATABLE?

A year ago, in the pages of this magazine, I wrote about the genetic marvel who had just won bodybuilding's most coveted title for the fourth time. In the fall of 2014, Phil Heath reached the halfway point on his quest for the all-time record and it was becoming gradually apparent that a lethal combination of size, shape and ungodly detail would prove to be too much for any of his challengers. The title of the article, published in the November 2014 issue of MD, posed a simple question, "*How Many More Will He Win?*"

A year later, as we look back on his most recent Olympia conquest—number five—the question still remains, "*How many more will he win?*" But suddenly, the answer isn't nearly as certain. The clarity of Phil's future has blurred, much the same as the detail in some of his once-celebrated rear poses. Is Phil still the

best bodybuilder in the world? ABSOLUTELY! In a sport that often crowns champions by measuring the absence of weak body parts, Phil has fewer of them than any bodybuilder on the planet. But how much longer will his lack of deficiencies be enough to keep him perched atop the sport?

Perhaps it's unfair to judge him against his past brilliance. 2011 and 2013 are widely considered his gold standard. Those were the years he wowed fans inside the Orleans Arena with a jaw-dropping compilation of anatomical absurdity, a four-dimensional presentation of detailed, bone-dry, razor-sharp mastery. He was undeniably in a league of his own.

Fast-forward to the 2015 Olympia, an event that saw the champ continue his reign. Only this time, the distance between Phil and the rest of the field seemed to have narrowed, a surprising development considering his

biggest threat chose not to compete in the contest. In the eyes of many in attendance, the 2015 contest was a four-way tug-of-war between evenly matched rivals. Phil was never sent "back in line" during the prejudging round—the judges instead forced the champ to go pose-for-pose with men who were once miles behind him. There was one point during the initial comparisons when I didn't even realize that the guy on the left side of a four-man callout was Phil Heath. In years past, my eyes were immediately drawn to Phil and the crisp, signature detail that earned him his *GIFTED* reputation. Suddenly, as he stood between Shawn Rhoden and Dexter Jackson, he blended in. The ocean that once separated him from those guys had nearly evaporated. During a visit to my PBW radio program, I asked Head Judge Steve Weinberger to summarize Phil's victory at this year's Olympia. He replied, "If it was a horse race, it was just by a nose."

As we contemplate how many more titles Phil can win, let's first examine the variables. For starters, who has the tools to beat him? The list of legitimate threats is very small. Despite his absence from the 2015 event, Kai Greene remains the number one challenger. Fans will forever speculate how Kai may have fared if he had been inserted into the 2015 lineup. And then there's Dexter Jackson. Conventional wisdom suggests that if Dexter wasn't deemed good enough to win this year, it's unlikely that he'll wrestle the title away next year, at age 46. A more compelling case can be made for the 31-year-old Big Ramy, the 315-pound Egyptian who landed in the Olympia top five. But the larger question is whether Phil and his trainer, Hany Rambod, can rediscover a formula like the one that had them poised for a generational run of dominance.

So, as we ask ourselves if Phil Heath can be defeated, the most honest answer is to simply acknowledge that it has never seemed more possible. ■

"THE MOST HONEST ANSWER IS TO SIMPLY ACKNOWLEDGE THAT IT HAS NEVER SEEMED MORE POSSIBLE."



Dan Solomon is the Senior Features Editor at Muscular Development. For nearly 15 years, Dan has conducted many of the most prominent bodybuilding interviews of all time, including memorable visits with Arnold Schwarzenegger, Joe Weider and other icons of the sport. Creator of the popular "PBW Radio" program, Dan has served as moderator of the Olympia Press Conference and lead commentator at many of the world's biggest bodybuilding events. Follow Dan on Twitter @DanSolomon100 and tune in to PBW at www.MuscularDevelopment.com/pbw.



WHY PHIL IS COUNTERPOINT UN-BEATABLE

Dan, you ignorant slut. No door has been opened, no gap has been shortened and no playing field has been leveled. If anything, Phil being able to win while NOT coming in at 100 percent only enforces the idea that no one is even close at this point and time. The fact that only Dexter, at 46 years old, has been able to gain a point against the champ in the last five years shows just how far away anyone is from making it a "close" competition.

The 2014 Mr. Olympia, which marked the 50th anniversary of the contest, was perhaps the best chance for Kai Greene to have presented a physique that COULD have beaten Phil. The problem was, Kai came in "off" as well. Had Kai presented the physique we had seen at the Arnold, we would be talking about how Phil was attempting to take back the title—much like his friend Jay Cutler did years ago, after losing it to Dexter Jackson in 2008. Does Kai have the tools to upset the champ? Well, he might very well have, if he could ever follow a game plan that doesn't try and beat Phil at being a better Phil. Kai simply comes in too big and loses the qualities that would have the best chance. The Kai of four to five years ago stands a better chance. Kai over 245 pounds is a bigger but blockier physique that falls right into the Heath trap.

The 2015 Olympia had NO Kai in the lineup circa ANY era. Kai choosing to sit this one out for whatever reasoning only guaranteed one thing, that Phil would have only one person to worry about—himself. Was Phil at his all-time best? No. Was he better

than last year? Yes, he was. Dexter delivered as he was expected to, but simply doesn't have enough artillery at this point and time to really be a threat. Phil would have had to show up at his all-time Olympia worst for Dexter (much less anyone else) to contend.

I've stated numerous times throughout the years, both on "PBW Radio" as well as in my column, that the only thing that can beat Phil is someone who presents something DIFFERENT. No one is going to be a better version of Phil than Phil is. At this point and time, there are only two contenders who have that: Cedric McMillan and Big Ramy. What Cedric lacks isn't physical; it's mental. Big Mac needs to start believing that he really is THAT good. Ced needs to break through the mental barrier that prevents him from becoming a formidable opponent of Phil's. Basically, he needs to stop being Mr. Nice Guy-Happy to Be Here-Let's Have a Good Time Out Here Onstage. Cedric needs to have a "hulk" button he presses and becomes angry—and believe me, you wouldn't like Cedric when he's angry. Cedric is taller than Phil, wider than Phil, bigger than Phil and combines great muscularity with exceptional lines, but the clock is ticking.

Big Ramy is a whole different animal. The man is a planet. At 300-plus pounds onstage, he's quite the sight to behold in person. He's also seen the inside of a gym for about the same amount of time as Phil's been collecting Sandows. What do Ramy and Phil have in common? Zero. This is what gives him the best shot of upsetting

the champ. At the end of the day it's a muscle contest, and Ramy has more of it per square inch than anyone else on the planet. What makes Ramy the biggest threat to Phil's title reign over anyone else is simple. He's got youth on his side, more muscle, the same size waist and now he's getting the last piece of the puzzle in place—experience. Conditioning is better in every show. Posing is more refined and professional, and he's gaining confidence in believing that he's got what it takes. Let's not forget, this is a guy who just a few years ago, was reading about these guys in the muscle magazines. The first year, he was awestruck and like a kid meeting his idols for the first time. Now, he's got the eye of the tiger.

Sorry, Dan—while you may look at Phil and his recent outings as cracks in the armor, I see it as Phil being THAT dominant. While I'm not disputing that his best hasn't been duplicated, it also hasn't been needed—as he's only being compared to himself at this point. You see his glass as half empty ... I see it as half full, and don't see anyone else having a glass at all.

Until someone steps it up and presents himself as a legitimate threat, it's Phil versus Phil in a competition of all-time Olympia wins. At the 2014 press conference, Phil gave three reasons why he would win the Olympia ... 2011, 2012 and 2013. He quickly made it FOUR. Now, he has enough reasons to count on one hand. The 2016 Olympia will be here before you know it ... someone lend Phil a hand, please! ■

Bob Cicherillo is the IFBB Athlete Representative and one of bodybuilding's best-known personalities. He is an IFBB pro who placed first and overall as a super heavyweight in the USA Championships and first in the Masters Pro World. Bob is host of over 20 bodybuilding shows throughout the season, including the Mr. Olympia.

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ADVENTURE TOUR *Wrap-Up*



As many of you know and have hopefully followed, we recently did a 25-day Adventure Tour across the USA. We have wanted to do something like this for a long time. Rob and myself made up a bucket list of places to go, sites to see and things to do across the country. We planned a tour trying to accomplish as much as we could from that list, while also making it to the Olympia on time to launch our new supplement line, Run Everything Labs, and make it home just in time for an already sold-out Warehouse Gym Camp. Besides seeing cool shit and doing cool shit along the way, we were able to meet and really connect and spend time with so many interesting and unique people.

The idea of this tour spawned from the last tour we did last summer, the Mt. Washington Tour. We sent an open invite out on the Internet to come join us and hike up Mt. Washington together. The next morning, about 50 people showed up. We ate breakfast together, spent the afternoon hiking and of course, took a giant selfie at the top! This experience was like no other. We really enjoyed spending time and actually getting to meet and talk with people for several hours instead of a couple of minutes, outdoors in fresh air, and doing an activity we love. This was seriously the best experience, not only for us but also for all the individuals who came out that day to meet us and hike.

Usually, the only way for fans and followers to meet us is at an expo or at some kind of appearance, like a store opening. At an event like this, the experience is ALWAYS the same: stand in an annoying *loooooong* line for several hours, we hug, we then usually apologize for you having to wait so long, you usually respond and say, "No problem, I just wanted to meet you two," then you

"THIS TOUR WAS REALLY THE BEST EXPERIENCE OF OUR LIVES, AND I THINK IT WAS ALSO THE BEST EXPERIENCE FOR OUR FOLLOWERS. WE WERE ABLE TO EXPERIENCE LIFE AND ADVENTURE TOGETHER OUTDOORS, DOING THINGS WE LOVE."



have about 30 seconds to say a couple of things, take a couple of weird pictures together, we make you do “the bear,” a silly pose we like to do for pics, and then we hug again and have to move to the next person. This whole process takes about two minutes. Yes, two freaking minutes, sometimes after waiting four to five hours in a line! That sucks! That is not a good experience at all. Not for us, and not for the people who come to see us! So we decided that we needed to try and fix that experience.

So then we came the idea of the Adventure Tour! We bought a much bigger, more appropriate touring RV, hooked-up with a full kitchen and shower, and lived out on the open road (at truck stops) for about 25 days, stopping at gyms and adventurous places along the way. It's really hard to highlight just a few places that were really memorable, because honestly, every single place we went was a freaking blast!

We started off really strong on the first day of the Adventure Tour at **Summersville Lake** in **West Virginia**. We spent the day on the lake on a pontoon boat swimming, paddleboarding, cliff jumping up to 30 feet in the air and even rock climbing. The very next day, we raced around **Burning Rock Outdoor Adventure Park** on about 8,000 acres of motocross and ATV trails. If you live in Texas and love getting wild in the sand, then you need to check out **The Dunes at Kermit**. We met up with Steve, who owns the park, and had him take us for a ride in his *super dune buggy death machine*, ripping through the dunes and soaring over jumps. This race buggy was unstoppable!!

We also stopped at several national parks that should be on your bucket list of places to go. First being the **Grand Canyon**! Pictures and video do not do this place justice—you must see it in person! It is no wonder that this place is one of the Seven Natural Wonders of the World. We spent the day walking the South Rim of the canyon near Mather Point, risking our lives and venturing out on the very sketchy edges of the canyon and just staring in amazement. We made our way to Northern California to see the amazing redwoods at **Redwood National Park**. I know they are just trees, but when a tree is 1,500 years old and 68 feet in diameter, that is pretty incredible!

Next we ventured through Oregon, which was simply breathtaking,



then to Washington where we stopped to hike the **Lewis River Falls** trail. This event was an open invite to all, and we had an amazing group of about 30 people who showed up to hike with us that day. It was a relaxing hike to all three waterfalls (lower, middle, and upper Lewis River Falls), and a few of us even took a dip in the *freeeeeeeezing* cold water!

Another open group hike day was to our favorite trail, **Avalanche Lake** in Montana's **Glacier National Park**. Again, a huge group of about 40 individuals and even entire families came out that morning to join us. We then drove the narrow and winding **Going-to-the-Sun Road** all the way to Logan Pass by Ruckus [scooter], stopping many times to take in the spectacular views. If you like to see animals, especially bison, **Yellowstone National Park** is the park for you. About two minutes after entering the park, we saw a bison on the side of the road. I had to immediately get out of the truck to take a selfie. Little did I know, I would then see about 40-50 more along our drive. We stopped to get a closer

“IT’S REALLY HARD TO HIGHLIGHT JUST A FEW PLACES THAT WERE REALLY MEMORABLE, BECAUSE HONESTLY, EVERY SINGLE PLACE WE WENT WAS A FREAKING BLAST!”



look at the geysers and also got to see Old Faithful erupt. We stopped at many other places and also stopped at some really kick-ass gyms along our travels, where we invited anyone and everyone to come out and train with us!

This tour was really the best experience of our lives, and I think it was also the best experience for our followers. We were able to experience life and adventure together outdoors, doing things we love, in a much less crowded and more relaxed

atmosphere. We had the ability to actually talk and be able to connect with the people who look up to us. The tour was NOT solely based on fitness, dieting and training. It was based on life goals and building stronger relationships with the people who look up to us.

Thank you to everyone who met us along the way! It was awesome meeting you and being able to connect with you! Rob and I are already planning a new Adventure Tour in the near future. Maybe even some international love?

To see pictures and watch videos of the entire tour, make sure to go check out the #fnfadventuretour blog on the www.flagnorfail.com blog page.

MY PLANS FOR 2016

Even though I don't have all of 2016 mapped out just yet, I can say it's going to be an extremely busy year. We are very close to opening the first Warhouse Gym in the Reading, Pennsylvania area. We have trademarked the name, and for the last couple of years we've used that name for the gym we have at our warehouse, which is the headquarters for Flag Nor Fail and all our other businesses. That's where we have been running our Warhouse Gym Camps once every month. But now it's time to venture into the world of

"I'VE HEARD THE RUMORS THAT I AM RETIRED AND WON'T BE COMPETING EVER AGAIN. WELL, IF YOU HAVE NOT ACTUALLY HEARD ME SAY THAT, THEN IT IS OBVIOUSLY NOT TRUE."

commercial gyms with the future goal of expanding to a franchise. The gym at our warehouse will be downsized from 8,000 square feet to about 3,000, and it will just be for us. Most of the equipment will be moving to the new place. One thing I can promise you is that when we have our grand opening, it will be the biggest gym party you have ever seen, and everyone is invited!

As for me competing in 2016, I'm not sure yet. I'd love to get back onstage, but it has to make sense. For the amount of time, effort and mental capacity I put

into preparing for a show, I can put that all into our business goals. Because I didn't spend the entire summer of 2015 getting ready for the Olympia, I was able to help start a supplement line, do most of the groundwork for opening our first commercial gym and plan and go on a 25-day Adventure Tour, where we connected with thousands of fans all over the USA. I couldn't have done any of those things if I were prepping for the Olympia, because it's just too time-consuming and a lot of stress on me.

I've heard the rumors that I am retired and won't be competing ever again. Well, if you have not actually heard me say that, then it is obviously not true. I have to see how this year goes. Just when I thought my schedule could not get any more hectic, we throw opening up a new public gym in the mix! The focus right now is going international with the supplement line. We're already in the U.K. and Australia and we're working on distribution in Canada, among other countries. And as soon as we finalize the purchase of the new gym, there will be some time renovating it and getting it ready for the grand opening. I'll just have to see how things pan out this year before I can commit to the Olympia or any other show. So I will keep you all updated about my plans to compete when I figure it all out.

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For workout ideas and inspiration, check out my *Olympia Prep* book. It is my entire training journal that includes every single detailed workout for the 2014 Olympia. I list for you exactly what I did each day including exercises, sets, reps and even notes on what I thought about it. My *Olympia Prep* book is available at www.danalinnbailey.com.

Arnold Prep Training Journal coming very soon!



PHOTOGRAPHY BY PER BERNAL

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Here at Team MD, we're looking forward to another year covering bodybuilding all across the globe. New shows are popping up all over the place, including shows in Poland, China and South Africa. People ask me all the time why bodybuilding is dying. Dying? Maybe it's just moving around! Here's a quick look back to how 2015 ended, and what you can look forward to in 2016.

DEXTER JACKSON AND WILLIAM BONAC END 2015 WITH A BANG

After the Olympia, the majority of the top-tier athletes headed straight to Europe for the Arnold Classic Madrid. With five-time Mr. Olympia Phil Heath out of the running, this became the first chance to prove who really was second-in-command. While in 2014 we saw Dexter Jackson, Shawn Rhoden and Dennis Wolf take turns at top-three finishes, this just wasn't the case this year. Dexter Jackson swept both the Arnold Classic Europe in Madrid and the EVLS Prague Pro. In fact, by the time we got to Prague, Mamdouh Elssbiay aka Big Ramy had worked his way up to second place, relegating Shawn Rhoden to third and Dennis Wolf to fourth. Segue to Finland, where the action centered on the battle between Roelly Winklaar and William Bonac. In a surprise upset, Bonac beat last year's champion, Roelly Winklaar. What does that mean for global bodybuilding in 2016? It means we have ourselves a level playing field. No one got a free pass for being last year's champion, and we'll have some guys out busting their asses to take back their titles this year. Global bodybuilding took a turn for the awesome in 2015.



ARNOLD CLASSIC FRANCHISE CONTINUES GROWTH



You can't deny that Arnold Schwarzenegger and his team are a force to be reckoned with when it comes to putting on a big show. Fans show up in the hundreds of thousands to Columbus, Ohio each year to witness what most consider the second-biggest bodybuilding show of the year. With Tony Doherty successfully turning his Australian Pro into the Arnold Classic Australia, there are two more Arnold Classics left to premiere: Arnold Classic South Africa and Arnold Classic China. Both shows look to be making their debut this year.

KEVIN LEVRONE TO DEBUT SHOW IN POLAND

Yes, that's right. Hall of Fame bodybuilder Kevin Levrone is promoting a show in Poland this year. When did he choose to put his show on the calendar? The week before the Arnold Classic in Ohio! Strategic move, if you ask me. You've got an A-list of athletes already in shape and a purse of \$60,000. That equals a whole lot of guys thinking *why not?*

ATHLETES TO WATCH IN 2016

I'd be remiss if I didn't say Big Ramy wasn't the one to watch in 2016. Last year he took four top-five finishes, including a win at the Arnold Classic Brazil and fifth place at the Olympia. By the end of the season, we saw him beating both Shawn Rhoden and Dennis Wolf. Is 2016 the year of Big Ramy? It's looking that way. Other notables, Roelly Winklaar and William Bonac, are established athletes from abroad who look to do well this year. My wild-card pick would be Manuel Romero. While he has yet to blow us away, he's got the tools to do it.



Yes, we'll be trotting the globe again in 2016. We're always looking for great gyms and great athletes to use for videos while we're out on our travels. Fill me in on what's going on in your corner of the world! Email me at adina@musculardevelopment.com.

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BY ADINA ZANOLLI

It's hard to believe we're at the start of another year at www.musculardevelopment.com. In 2015, we sent crews all around the globe covering events, filming training videos and keeping up with the major bodybuilding news. A new year always pushes us to see what else we can add to stay on top as your number-one multimedia source for bodybuilding news and information. This year will be no exception. We've got many things taking shape as the new year starts, but here's a taste of what you can find at the website now.

f SOCIAL MEDIA

As always, we continue to use all forms of social media in conjunction with the MD website. We've yet to tackle Periscope, but that's our next venture. Look for Team MD to starting using Periscope this month to give you up-to-the-minute news. Team members like David Baye will be taking a turn at the wheel to bring you news faster and better in 2016. You'll also see us get more into using Instagram and YouTube throughout the year.



TAPATALK AT THE NO BULL FORUMS

Another social media platform you'll see us use more in 2016 is Tapatalk. We already use it now in contest coverage to get the picture to you live. In 2016 we'll be adding videos to give you live answers to your questions at the No Bull Forums.



NPC/IFBB CONTEST COVERAGE IN 2016

In a few short weeks, we'll plunge headfirst into a new season of contest coverage. Shawn Ray, Peter McGough, Dan Solomon, David Baye, Bob Cicherillo and the entire team are ready to get back in gear. New shows are popping up each month, and we look forward to bringing you pictures, videos and results from all major shows. Last year the IFBB/NPC broke records all over the place, and Team MD was there. In one show alone, we uploaded over 50,000 photos to our contest database. Where will records be broken in 2016? Will Dexter Jackson become the winningest bodybuilder of all time this year? Will Phil Heath take another Sandow? Which show will garner Roelly Winklaar his Olympia qualification? Follow Team MD via the MD home page and No Bull Forums to watch as history unfolds.

ROELLY WINKLAAR'S EUROPEAN TOUR FUN

I definitely got to end my time abroad in 2015 on a high note. As luck would have it, the Nordic Pro promoter, K.P. Ouramo, was very accommodating to my coming to Finland directly from the EVLS Prague Pro. This meant arriving in Finland on Monday. IFBB pro bodybuilder Roelly Winklaar was also coming in early. We ended up on the same floor at the same hotel, and Roelly was gracious enough to let me document the entire week. From the first coat of Pro Tan, to the last carb-up meal, we documented it all at the No Bull Forums. If you want to see what the week before a show is like for a top-level athlete, you'll want to search out the Nordic Pro thread.



A new year means new ideas, and we want to hear yours! The MD website is for you! If there is anything new or different you'd like to see, drop me a line. Email me at adina@musculardevelopment.com.

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ARTERIAL STIFFNESS DECREASES THE CAPACITY OF BLOOD VESSELS TO CONTROL BLOOD FLOW, INCREASES BLOOD PRESSURE AND OVERLOADS THE HEART. Arterial stiffening is linked to poor metabolic health and the metabolic syndrome—a group of health problems related to heart disease and stroke that include high blood pressure, insulin resistance, type 2 diabetes, abnormal blood fats and abdominal obesity. Weight training can also increase arterial stiffness. A study from the University of Basel in Switzerland found that arterial stiffness was greater following upper-body weight training compared to lower-body or whole-body weight training. Upper-body exercise places a greater load on the heart and blood vessels because they overload relatively small muscles. Other studies have shown that aerobic exercise following weight training can override the negative effects of weight training on arterial stiffness. Bodybuilders and other weight-trained athletes should finish workouts with at least some aerobic exercise to prevent blood vessel stiffening and high blood pressure. (International Journal Sports Medicine, published online July 15, 2015)

TRAIN FREQUENTLY

FOR GREATER HYPERTROPHY

WHOLE-BODY WORKOUTS PRACTICED THREE DAYS PER WEEK WERE SUPERIOR TO SPLIT WORKOUTS EMPHASIZING SPECIFIC MUSCLE GROUPS ONE TIME PER WEEK WHILE TRAINING THREE TIMES PER WEEK—according to a study led by Brad Schoenfeld from CUNY Lehman College in New York. The idea behind split routines is that they allow athletes to train specific muscle groups more intensely, while performing the same training volume. Some bodybuilders believe they may promote muscle growth, enhance neuromuscular performance and prevent overtraining. This study showed that hitting muscle groups more frequently might produce more hypertrophy. The study used college students who were relatively untrained, so it is difficult to determine if the results apply to elite bodybuilders. (Journal Strength Conditioning Research, published online April 30, 2015)



HEAVY-LOAD SQUATS Recruit More Motor Units Than Light-Load Squats to Failure

MOTOR UNITS ARE TRAINED IN DIRECT PROPORTION TO THEIR RECRUITMENT (ACTIVATION). Bill Kraemer and colleagues from The Ohio State University found that motor unit activation, as measured by peak EMG amplitude, was greatest when training at 90 percent of one-repetition maximum (1RM) to failure, compared to training at 70 percent or 50 percent of 1RM to failure. Maximize strength and hypertrophy by using heavier loads. This is important information for bodybuilders and power athletes. (Journal Strength Conditioning Research, published online August 10, 2015)

IS FAILURE TRAINING Critical for Muscle Growth?

FAILURE TRAINING IS A POPULAR TECHNIQUE FOR MAXIMIZING MUSCLE PROTEIN SYNTHESIS AND MUSCLE SIZE. Failure training is not necessary for optimal adaptations to weight training—according to John Sampson and colleagues from the University of Wollongong in Australia. They compared training responses to failure, non-failure rapid shortening, and non-failure stretch shortening using the elbow flexors (biceps) during a 12-week program. All of the groups experienced improvements in strength, one-repetition maximum curl, muscle size and muscle activation. However, there were no differences between training methods. This was a small study involving recreationally active students, so the results are difficult to generalize to elite bodybuilders and strength athletes. (Scandinavian Journal Medicine & Science in Sports, published online March 24, 2015)

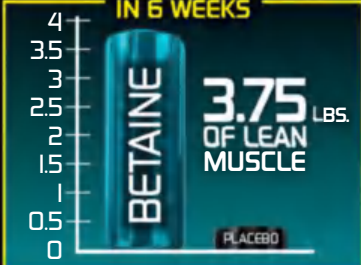
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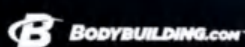
Test subjects supplementing with 2.5g of **betaine** built 5.5 times more lean muscle than the placebo group (3.75 lbs. vs. 0.66 lbs.). In a separate study, betaine was shown to enhance muscle endurance.

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MB TRAINING CUTTING-EDGE RESEARCH

Best Repetition Duration FOR MUSCLE GROWTH

THE TIME MUSCLE FIBERS ARE UNDER TENSION IS THE MOST IMPORTANT FACTOR AFFECTING MUSCLE HYPERTROPHY. Tension promotes amino acid transport into the muscles, activates the mTOR pathway of protein synthesis, and triggers small injuries in the muscle cell structure that leads to repair and additional growth. Brad Schoenfeld and colleagues from Lehman College in New York, in a meta-analysis that pulled the results of many studies in the literature, found that the optimum repetition duration varies from 0.5 to eight seconds. Training at slow repetition speeds greater than 10 seconds did not produce hypertrophy at the same rate as lifting faster. The researchers concluded that more research is necessary before we can state the ideal repetition duration. (Sports Medicine, published online January 20, 2015)

PRE-EXHAUSTION TRAINING BUILDS MUSCLE MASS

PERFORMING A LOW-RESISTANCE SET TO FAILURE (20 PERCENT OF YOUR ONE-REPETITION MAXIMUM, OR 1RM) BEFORE DOING TRADITIONAL WEIGHT TRAINING FOR A MUSCLE GROUP RESULTS IN GREATER MUSCLE HYPERTROPHY—ACCORDING TO BRAZILIAN RESEARCHERS. Young men trained for eight weeks on a knee-extension machine. The program consisted of three sets of eight to 12 repetitions at 75 percent of 1RM. Before each workout, one pre-exhaustion group did a single set of knee extensions to exhaustion using light weights. The pre-exhaustion group gained more muscle mass, strength and muscle endurance than the group training with traditional methods. It is unclear whether this technique works with more experienced bodybuilders practicing multi-joint exercises. (European Journal of Applied Physiology, published online March 10, 2015; Annals of Internal Medicine, 162: 326-334, 2015)



Aerobics Interfere With STRENGTH TRAINING

MOST RECREATIONAL ATHLETES COMBINED AEROBICS AND STRENGTH TRAINING SO THAT THEY CAN DEVELOP WELL-ROUNDED FITNESS AND NOT SPEND TOO MUCH TIME IN THE GYM. A Brazilian study showed that the order of training was important for optimizing strength performance. Performing either treadmill or stationary bike exercise prior to strength training decreased the quality of the strength-training workout, with the stationary bike causing a greater decrease than the treadmill. Train for strength first and then practice aerobics. In other studies, Japanese researchers found that practicing aerobics after strength exercises was healthier for blood vessels. (Journal Strength Conditioning Research, 29: 1077-1082, 2015)

IS FIVE SETS BEST FOR WEIGHT-TRAINING PROGRAMS?

IN BEGINNING WEIGHT TRAINERS, MOST STUDIES SHOW THAT ONE SET IS AS EFFECTIVE AS MULTIPLE SETS FOR INCREASING STRENGTH AND POWER. However, this is highly controversial. Critics say that most of these studies were poorly controlled, and didn't pay close enough attention to the intensity of the training programs. A Brazilian study using untrained young men found that five sets per weight-training exercise was superior to one or three sets in several measures of strength, during a six-month training program. However, at the beginning of the study, the five-set group was markedly stronger than the other groups, even though the test subjects were randomly assigned to training groups. Training studies are notoriously difficult for researchers. In assessing the practical significance of training studies, we must consider factors such as the training levels of the test subjects, unintended bias in the research design and the supervision of the training sessions. (Journal Strength Conditioning Research, Published Online January 2015)

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Seventeen years ago, MuscleTech® revolutionized musclebuilding with the groundbreaking formulation of NITRO-TECH® – a scientifically superior whey isolate formula that helped elite athletes build lean muscle. Today, MuscleTech® researchers are changing the way you build muscle – again. New MuscleTech® NITRO-TECH® RIPPED is an advanced formula that combines the highest quality whey protein peptides and isolate with a scientifically tested weight loss complex. This premium protein + weight loss formula is like nothing you've ever tried before ... trust us.

- 7-in-1 formula also delivers ultra-pure CLA, MCTs, L-carnitine L-tartrate, green tea extract, rose hip and kelp powder
- Subjects taking the key weight loss ingredient in NITRO-TECH® RIPPED (*C. canephora robusta*) lost an average of 10.95 lbs. in 60 days with a low-calorie diet, and 3.7 lbs. in 8 weeks following a calorie-reduced diet and moderate exercise
- Big results and equally massive flavors – Chocolate Fudge Brownie and French Vanilla Swirl

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3. 250mg Conjugated Linoleic Acid (CLA)
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6. 20mg Premium Kelp
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LEAN MUSCLE

WAKAME SEAWEED FIGHTS FAT

WAKAME (BROWN) SEAWEED CONTAINS A CHEMICAL CALLED FUCOXANTHIN (FX) THAT INHIBITS FAT CELL GROWTH AND PROMOTES FAT RELEASE. A review of literature by scientists from the Ukraine and Korea noted that most studies on FX have examined its effect on rats and mice. To date, no large-scale studies have been done in humans. Animal studies have shown that FX reduces total body fat and abdominal fat, promotes blood sugar control, prevents fat accumulation in the liver and improves the blood fat profile. Studies have found that FX increases brown fat activation and increases energy expenditure. Brown seaweed is a natural product with no known toxic effects. (Nutrition, Metabolism & Cardiovascular Diseases, published online June 3, 2015)



HIGH IRON LEVELS LINKED TO OBESITY

HIGH BLOOD IRON, AS MEASURED BY FERRITIN, IS A MARKER OF POOR METABOLIC HEALTH AND IS ASSOCIATED WITH AN INCREASED RISK OF HEART ATTACK. An Italian study found that high iron levels reflect total body inflammation. They found a relationship between body mass index (weight in proportion to height) and blood iron levels. Blood iron levels decreased during weight loss caused by low-calorie dieting. Blood iron levels were also linked to high blood triglycerides and abnormal liver function. (Nutrition, Metabolism and Cardiovascular Diseases, published online March 4, 2015)



Chili Ingredient Is an Effective Fat Fighter

CAPSAICIN (A CAPSAICINOID) IS THE CHEMICAL THAT PUTS THE ZING IN CHILI PEPPERS. Supplements containing capsaicin increase caloric expenditure for several hours and might be useful as a weight-loss supplement. Capsaicin works by increasing levels of the “fight-or-flight” hormone epinephrine (adrenaline), which speeds fat use and increases metabolism. A study on mice by Baskaran Thyagarajan from the University of Wyoming, and colleagues, showed that increasing capsaicin in their diet prevented obesity by increasing energy expenditure and metabolism. Most studies show that capsaicin increases daily caloric expenditure by four to five percent and fat use by 10 to 16 percent. It is not a magic bullet that triggers massive weight loss, but helps promote weight control over time. (Study presented at Biophysical Society Annual Meeting, February 8, 2015)



BILE ACID ACTIVATES BROWN FAT

BROWN FAT (BROWN ADIPOSE TISSUE, BAT) CONVERTS FOOD ENERGY DIRECTLY INTO HEAT. White fat does the opposite—it stores energy. Individual differences in BAT content and activity play an important role in human obesity. Increasing brown fat activation helps burn more calories and fat. Patrick Schrauwen and co-workers from Maastricht University Medical Center in the Netherlands found that oral supplements of the bile acid chenodeoxycholic acid increased brown fat activity in adult women. Bile salts are produced in the liver and have hormone-like effects on metabolism. Bile acids are currently available in Advanced Molecular Labs' (AML) Thermo Heat, the original brown fat activator. (Cell Metabolism, 22:418-426, 2015)

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- Free testosterone support and enhanced ATP regeneration – needed for the biochemical reactions involved in a muscle contraction
- Plus tart cherry powder shown in emerging research to reduce muscle soreness

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4. 6g Creatine Monohydrate
5. 200mg Test-Boosting Boron Citrate
6. 480mg Tart Cherry Powder

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FAT LOSS CUTTING-EDGE RESEARCH

CHEMICAL IN APPLES PROMOTES FAT LOSS

URSOLIC ACID IS A CHEMICAL FOUND IN APPLES, BASIL, CRANBERRIES, PEPPERMINT, OREGANO AND PRUNES. It is used in a variety of cosmetic products and can inhibit the growth of some types of cancer cells. A Chinese study on rats found that ursolic acid supplements reduced bodyweight, increased caloric expenditure and decreased fat levels in muscle. Ursolic acid promoted fat loss by increasing the activity of uncoupling proteins in the cells, which causes fat loss by promoting heat formation. Ursolic acid is also anabolic. A University of Iowa study in mice found that ursolic acid found in apple peels prevented muscle deterioration following fasting and spinal cord injury. Ursolic acid supplements also increased muscle mass in normal mice. The anabolic effect of ursolic acid is caused by increased insulin signaling in skeletal muscle and the suppression of gene activity linked to atrophy (decreased muscle size). Ursolic acid might speed fat loss and build muscle. (Molecular Nutrition & Food Research, published online May 5, 2015)



MELATONIN CUTS FAT AND INCREASES LEAN MASS

MELATONIN IS A HORMONE PRODUCED BY THE PINEAL GLAND IN THE BRAIN THAT PROMOTES SLEEP AND DAILY BIOLOGICAL RHYTHMS. Danish researchers from Aarhus University, led by Anne Amstrup, found that women consuming 3-5 milligrams of melatonin daily for one year decreased body fat by nearly seven percent and increased lean mass by 5.2 percent, compared to a placebo treatment (fake melatonin). There were no differences in weight, body mass index or blood sugar regulation between the experimental and control groups. (Clinical Endocrinology, published online September 9, 2015)

Fat Burning Greatest After an Overnight Fast

EXERCISING FOLLOWING AN OVERNIGHT FAST WILL BURN MORE FAT THAN EXERCISING AFTER BREAKFAST, ACCORDING TO KOREAN RESEARCHERS. Test subjects reported to the laboratory for a 30-minute treadmill run, either fasted or after breakfast. When fasted, blood sugar was lower and free fatty acids, growth hormone and cortisol were higher than when the subjects ate breakfast. Consistently exercising while fasted in the morning should result in greater fat burning and fat loss than exercising after breakfast. (Journal of Physical Therapy Science, 27:1929-1932, 2015)

LOW VITAMIN D LEVELS PREVENT WEIGHT LOSS

VITAMIN D DEFICIENCY IS 35 PERCENT HIGHER THAN NORMAL IN OBESE PEOPLE, AND 24 PERCENT HIGHER IN OVERWEIGHT PEOPLE—ACCORDING TO A META-ANALYSIS BY BRAZILIAN RESEARCHERS. Vitamin D deficiency can make it difficult to lose weight. The initial vitamin D level is a good predictor of weight loss during calorie restriction. People with low vitamin D levels have difficulty losing weight, while those with the highest levels lost the most weight. People should get 400-800 units of vitamin D from the diet, supplements or sun exposure. Low vitamin D levels are a problem in many people because they spend much of their time indoors and shun vitamin D-fortified milk in favor of other beverages. (Obesity Reviews, 16: 341-349, 2015)



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Should You EAT EGGS?

CLASSIC SCIENTIFIC STUDIES, SUCH AS THE FRAMINGHAM AND SEVEN COUNTRIES STUDIES, SHOWED THAT ELEVATED BLOOD CHOLESTEROL WAS LINKED TO HEART ATTACK AND STROKE. Eggs are unusually high in cholesterol, so they were blamed for a good portion of the heart disease in America. Frank

Sacks from Harvard University said that saturated fat in foods was more important than cholesterol for boosting blood cholesterol and that eggs were unfairly blamed for the high rate of heart disease in America. While eggs are experiencing a nutritional renaissance, other studies show that eggs are not a risk-free food.

People with diabetes who ate one egg a day increased their risk of heart disease by 44 percent compared to people who only ate one egg per week. Egg eaters are also more likely to get prostate cancer. Most mainstream nutritionists recommend that people follow healthy dietary patterns that include increased consumption of fruits, vegetables, whole grains, low-fat dairy, seafood, beans and nuts. People should also consume alcohol moderately, reduce intake of red and processed meats, and reduce consumption of high sugar foods. Eggs can be part of a healthy diet. (Nutrition Action Health Letter, June 2015)

Omega-3 Fatty Acid Supplements Increase IGF-1

LOW LEVELS OF THE ANABOLIC HORMONE IGF-1 ARE LINKED TO AN INCREASED DEATH RISK IN PEOPLE WITH CARDIOVASCULAR DISEASE. Omega-3 fatty acids are protective against heart disease and work by enhancing blood vessel health. An Iranian study showed that supplementing omega-3 fatty acids increased IGF-1 levels in people with coronary artery disease. While interesting, this study does not show that taking omega-3 fatty acid supplements will decrease the risk of heart attack. However, this was an interesting study that might have important implications for preventing heart disease. (Nutrition, 31:480-484, 2015)



Citrulline Malate IMPROVES STRENGTH-ENDURANCE

CITRULLINE MALATE INCREASED STRENGTH ENDURANCE IN CHIN-UPS, REVERSE CHIN-UPS AND PUSH-UPS IN COLLEGE-AGED MEN— ACCORDING TO A STUDY LED BY BENJAMIN WAX FROM MISSISSIPPI STATE UNIVERSITY. Citrulline is an amino acid that is converted to arginine, which increases levels of nitric oxide— an important chemical that regulates blood flow throughout the body. Citrulline also increases brown fat activity, which increases caloric expenditure and promotes fat burning. It does this without stimulating the sympathetic nervous system, which avoids increases in heart rate, blood pressure and anxiety levels. Citrulline malate might be an effective supplement for bodybuilders. (Journal of Dietary Supplements, published online February 12, 2015)



Low-Carbohydrate Diets REDUCE POWER OUTPUT

DURING THE FIRST SIX MONTHS OF WEIGHT LOSS, LOW-CARBOHYDRATE DIETS ARE MORE EFFECTIVE THAN LOW-FAT OR MIXED DIETS. This has encouraged some athletes to use low-carb diets to fuel their training sessions. This is a mistake. Research since the 1960s has shown definitively that carbs are the main fuel for exercise at intensities above 65 percent of maximum effort. Endurance decreases markedly during low-carb dieting, particularly during repeated training sessions. A Brazilian study showed that low-carbohydrate diets decreased high-intensity exercise capacity (max watts) and endurance in physically active men. However, the perception of effort was not different between low- and high-carbohydrate diets. In other words, you don't feel any worse during exercise on low-carb diets, but you can't exercise as hard. Eat your carbs when you're training hard. (International Journal Sports Nutrition Exercise Metabolism, 24: 532-542, 2014)

HIGH DAIRY FOOD INTAKE *Increases the Risk of Prostate Cancer*

A META-ANALYSIS THAT COMBINED THE RESULTS OF 32 STUDIES FOUND THAT HIGH INTAKE OF DAIRY FOODS INCREASE THE RISK OF PROSTATE CANCER BY THREE TO NINE PERCENT.

Supplemental calcium did not increase the risk of the disease. Both nonfat and whole milk increased the risk of prostate cancer equally, so some component of milk other than calcium or fat might trigger the cancer. Last year, prostate cancer killed more than 30,000 men in the United States, making it the second most common cause of cancer-related death.

Prostate cancer kills only three out of 100 men, yet 50 percent of men over 50 and 75 percent of men over 85 have the disease. Being overweight, obese and smoking increase the risk of dying from the disease. Regular exercise is protective. Walking briskly for three hours per week reduces the risk of prostate cancer progression by 57 percent. Eating cruciferous vegetables such as broccoli, Brussels sprouts and cauliflower reduces the progression of the disease. A healthy lifestyle consisting of weight control, regular exercise and a balanced diet is the best way to avoid the deadly form of prostate cancer. (American Journal of Clinical Nutrition, 101:87-117, 2015)

DIETARY CARBS Important for High-Intensity Exercise

DURING THE FIRST SIX MONTHS OF WEIGHT LOSS, LOW-CARBOHYDRATE DIETS ARE MORE EFFECTIVE THAN LOW-FAT OR MIXED DIETS. This has encouraged some athletes to use low-carb diets to fuel their training sessions. This is a mistake. Research since the 1960s has definitively shown that carbs are the main fuel for exercise at intensities above 65 percent of maximum effort. Endurance decreases markedly during low-carb dieting, particularly during repeated training sessions. A Brazilian study showed that low-carbohydrate diets decreased high-intensity exercise capacity and endurance in physically active men. Exercise capacity was measured in maximum watts, or the power you produce during training—the more power you are producing, the harder you are working. Notably, the perception of effort was not different between low- and high-carbohydrate diets. In other words, you don't feel any worse during exercise on low-carb diets but you can't exercise as hard. Eat your carbs when you're training hard. (International Journal Sports Nutrition Exercise Metabolism, 24: 532-542, 2014)

URSOLIC ACID Promotes MUSCLE GROWTH

URSOLIC ACID IS A CHEMICAL FOUND IN APPLES, BASIL, CRANBERRIES, PEPPERMINT, OREGANO AND PRUNES. IT IS USED IN A VARIETY OF COSMETIC PRODUCTS AND CAN INHIBIT THE GROWTH OF SOME TYPES OF CANCER CELLS. A Korean study found that ursolic acid supplements combined with weight training increased strength and muscle mass more than weight training alone. The supplement appeared to work by increasing levels of irisin in blood. Studies have shown that irisin also makes fat cells more thermogenic (calorie burning). It is found in Advanced Molecular Labs' (AML) Thermo Heat. Ursolic acid and has recently been shown to increase brown adipose tissue (BAT) or brown fat. BAT normally generates body heat by vigorously burning body fat by a process known as non-shivering thermogenesis. The ability to burn fat with BAT represents a promising way to improve fat loss. (Korean Journal Physiological Pharmacology, 18: 441-446, 2014)

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MASSAGE IMPROVES PERFORMANCE

AFTER EXERCISE-INDUCED MUSCLE DAMAGE

FIFTEEN MINUTES OF MASSAGE TO THE CALF MUSCLES FOLLOWING MUSCLE-DAMAGING EXERCISE RESULTED IN GREATER MUSCLE STRENGTH AND PROPRIOCEPTION, COMPARED TO A GROUP RECEIVING NO MASSAGE—ACCORDING TO RESEARCHERS FROM KOREA. Proprioception is the perception of movement and spatial orientation of various parts of the body. Muscle damage was induced using eccentric contractions, which injure important parts of the muscle cells (Z lines) and trigger secondary inflammation. Delayed onset muscle soreness (DOMS) has been a serious challenge to muscle physiologists for more than 100 years. Treatments such as stretching, ice, heat, active exercise, nonsteroidal anti-inflammatory drugs and muscle relaxers have been largely ineffective. Post-exercise massage might help prevent DOMS. (Journal Strength Conditioning Research, 29: 2255-2260, 2015)



Alcohol Inhibits Muscle Protein Synthesis

MOST COACHES ADVISE ATHLETES TO AVOID ALCOHOL DURING INTENSE TRAINING. It turns out they were right. Alcohol consumption slows protein synthesis triggered by resistive exercise—according to a study on mice by scientists from Penn State College of Medicine. The animals received 10 sets of six repetitions of electrical muscle stimulation. Two hours later, they were injected with enough alcohol to cause intoxication. Electrical stimulation increased protein synthesis by 28 percent, but the alcohol stopped the process. If these results apply to humans, athletes should refrain from alcohol consumption following intense exercise designed to increase muscle mass. (Alcoholism: Clinical and Experimental Research, 39: 1-10, 2015)



WHY MORE PEOPLE GET SICK IN THE WINTER



RATES OF COLDS, FLU, HEART ATTACK, STROKE, AUTOIMMUNE DISEASE AND PSYCHIATRIC ILLNESSES ARE MUCH HIGHER IN THE WINTER THAN IN THE SUMMER.

Researchers from University of Cambridge in the United Kingdom found increased activity levels of genes controlling the immune system during colder times of the year. They examined immune system activity in the United Kingdom and Gambia (located in Africa) during different seasons of the year. Inflammation, which is linked

to poor metabolic health and the long-term risk of heart attack and stroke, was higher during the colder months. The cold months of the year can be dangerous for your health. (Nature Communications, published online May 12, 2015)

IBUPROFEN AND ACETAMINOPHEN INHIBIT MUSCLE PROTEIN SYNTHESIS



INTENSE WEIGHT TRAINING OFTEN LEAVES ATHLETES WITH SORE JOINTS AND MUSCLES. Many take drugs like ibuprofen and acetaminophen to cut the pain. This is a mistake. A study led by Todd Trapp and Eileen Weinheimer from Ball State University in Muncie, Indiana found that both drugs inhibited protein synthesis after weight training. These drugs block the production of cyclooxygenase (COX), which stimulates the production of inflammatory chemicals called prostaglandins. Inflammation is painful, but it is the body's way of coping with cell injury and irritation. Some inflammation appears critical for promoting protein synthesis following weight training. Bodybuilders should minimize the use of ibuprofen and acetaminophen. (American Journal of Physiology Regulatory, Integrative and Comparative Physiology, 292: R2241- R2248, 2007)

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FDA: NSAIDs Increase the Risk of Heart Attack, Stroke and Heart Failure



THE U.S. FOOD AND DRUG ADMINISTRATION (FDA) ISSUED A WARNING THAT NON-ASPIRIN NONSTEROIDAL ANTI-INFLAMMATORY DRUGS SUCH AS IBUPROFEN AND NAPROXEN INCREASE THE RISK OF STROKE, HEART ATTACK AND HEART FAILURE BY 10 TO 50 PERCENT— DEPENDING UPON DOSAGE AND HEALTH STATUS. The risk of serious cardiovascular events is higher in people with established cardiovascular disease, but even healthy people are at risk. The FDA warning included prescription and over-the-counter NSAIDs. Other studies have shown that NSAIDs slow muscle hypertrophy. These drugs are widely used to fight pain and inflammation in bodybuilders. Athletes should minimize the use of these drugs. (The New York Times, July 10, 2015)

HIGH IRON LEVELS LINKED TO HIGH BLOOD PRESSURE

POOR DIET, BLOOD CELL DESTRUCTION FROM ACTIVITIES SUCH AS JOGGING, AND MENSTRUATION CAN ALL LEAD TO IRON-POOR BLOOD. To compensate, many people take iron supplements and eat foods high in iron to boost intake. You can get too much of a good thing. High iron (ferritin) levels in men are linked to high blood pressure and heart disease— according to a study from Kyung Hee University School of Medicine in Korea. Humans have a limited capacity to get rid of iron, so it can build up if you consume too much. Excessive blood iron can promote tumor growth, speed cell membrane breakdown and increase the risk of heart attack. In women, high levels of serum ferritin (a good measure of total body iron stores) was related to increased risk factors of heart disease, such as high blood pressure, body mass index (the proportion of weight to height), total cholesterol and triglycerides, and low HDL cholesterol. (International Journal of Cardiology, 183:258-262, 2015)

TABLETS AND SMARTPHONES ARE ROBBING YOU OF SLEEP



IN 1900, PEOPLE SLEPT NINE HOURS A NIGHT. That declined to seven hours a night in the 1970s and decreased further until today. Inadequate sleep is linked to poor concentration, anxiety, loss of energy, decreased learning ability, reduced attention to detail and motor vehicle accidents. How did sleep, which came so naturally, suddenly become a crisis? What is the smoking gun that explains modern sleep problems? Scientists found that the culprit is an unusual suspect hiding in plain sight— smartphones, tablets, backlit e-readers and computer screens. These devices emit light, particularly blue light that disturbs biochemical processes that promote sleep. They also increase exposure to electromagnetic radiation, which is linked to insomnia, headache and confusion. The radiation from cell phones interferes with brain centers that secrete hormones and influence many aspects of body function. Our bodies pay a price from surrounding ourselves with fancy smartphones, tablets and light-emitting gadgets— the price is lost sleep. (Proceedings National Academy Of Sciences, USA 112: 1232-1237, 2015)

Should Aging Men Take TESTOSTERONE SUPPLEMENTS?

PRESCRIPTIONS FOR TESTOSTERONE REPLACEMENT HAVE TRIPLED SINCE THE YEAR 2000. NEARLY FOUR PERCENT OF U.S. MEN OVER 60 YEARS TAKE TESTOSTERONE. The safety and effectiveness of testosterone supplements have been controversial ever since the development of testosterone drugs in the 1930s. Several recent studies found an increased risk of heart attack in patients receiving testosterone, but these studies have been severely criticized by most hormone specialists. A column in the *New England Journal of Medicine* called Clinical Decisions presented the case of a 61-year-old overweight man with slightly elevated blood fats, blood pressure and PSA (predictor of prostate problems) and decreased sex drive. One physician recommended testosterone supplements to boost sex drive and muscle mass. Another physician recommended against supplements because of possible risks to the cardiovascular system and prostate. The benefits were not worth the risks. The risks and benefits of testosterone therapy will probably be controversial for another 50 years. (*New England Journal of Medicine*, 371: 2032-2034, 2014)

Long-Term Clenbuterol Use Decreases Muscle Efficiency

SOME BODYBUILDERS USE CLENBUTEROL TO BUILD MUSCLE AND CUT FAT. THE DRUG IS A BETA 2-AGONIST USED TO TREAT ASTHMA AND OTHER LUNG DISEASES. Studies in humans and racehorses show that clenbuterol increases muscle mass and decreases fat. However, the drug is linked to heart failure in racehorses, and often has severe side effects in human athletes. A French study showed that while clenbuterol causes hypertrophy, muscle force does not keep pace with the increase in muscle surface area. The capacity of muscle to contract and relax is reduced, particularly in fast-twitch muscle fibers. The researchers concluded that chronic clenbuterol use results in reduced muscle contractile efficiency and impairs the capacity of the muscles to relax. (*The Journal of Physiology*, published online February 27, 2015)

TESTOSTERONE IMPLANTS Offer Long- term Treatment Option for Testosterone Therapy

IN THE 1966 SCIENCE FICTION FILM "FANTASTIC VOYAGE," SCIENTISTS SHRUNK TO MICROSCOPIC SIZE TRAVELED INTO THE BODY TO REPAIR THE DAMAGED BRAIN OF AN IMPORTANT PERSON WHO WAS SHOT IN THE HEAD. While we can't travel around in the body in miniature spaceship-like vehicles, nanomedicine is a reality. Miniature systems can be implanted in the body to deliver drugs and monitor organ and cell function. Scientists led by Alessandro Grattoni, from the Department of Nanomedicine at Houston Methodist Research Institute, reported the development of a nano-testosterone delivery system that could maintain normal testosterone levels for six months in hypogonadal men. When approved and available, this system will provide a simple way to maintain biologically normal levels of the hormone. (*Journal of Sexual Medicine*, published online June 5, 2015)

STERIOD USE HAS NEGATIVE LONG-TERM EFFECTS on Gonadal Function

ANABOLIC STEROIDS SUCH AS TESTOSTERONE SUPPRESS NATURAL TESTOSTERONE PRODUCTION. Hormones work on a feedback system that regulates production based on circulating levels. When you take testosterone or other anabolic steroids, the hormone regulators reduce natural production of testosterone. When you stop taking the drugs, the feedback system takes a while to adjust and restore the hormone balance back to normal. Harvard researchers found that former steroid users had smaller testicular volume and lower circulating blood testosterone levels, even though they hadn't taken the drug in three to 26 months. Former users also showed reduced sexual desire, greater incidence of depression as well as erectile dysfunction, compared to a control group of athletes who never took steroids. Two of the men in the study failed to restore normal sex drive or erectile function, even when given testosterone therapy. (*Addiction*, published online January 19, 2015)



Testosterone Supplements Do Not Accelerate Cardiovascular Disease

ATHEROSCLEROSIS (HARDENING OF THE ARTERIES) DID NOT PROGRESS IN MEN WITH LOW OR SUBNORMAL TESTOSTERONE LEVELS TREATED WITH SUPPLEMENTAL TESTOSTERONE FOR THREE YEARS— ACCORDING TO A STUDY LED BY SHALENDER BHASIN FROM HARVARD MEDICAL SCHOOL, AND COLLEAGUES. Aging men (average age 67.6) received testosterone gel or placebo (fake testosterone) daily for three years. The dose was adjusted so that blood levels of testosterone were between 500 and 900 nanograms per 100 milliliters of blood (normal levels for young men). The testosterone supplements did not cause changes in the thickness of the coronary or carotid arteries or in blood vessel calcium deposition. Hormone replacement therapy does not accelerate coronary artery disease in aging men. (Journal American Medical Association, 314:570-581, 2015)

IBUPROFEN Does Not Promote Recovery

MANY ATHLETES TAKE NONSTEROIDAL ANTI-INFLAMMATORY DRUGS SUCH AS IBUPROFEN TO REDUCE PAIN AND PROMOTE RECOVERY AFTER INTENSE WORKOUTS. Ibuprofen did not affect distance-running performance after an intense leg workout designed to cause muscle soreness— according to a study from Brazil. Distance runners participated in a time trial followed by an intense leg workout. They were given either ibuprofen or a placebo (fake ibuprofen). Forty-eight hours later, they completed a second time trial. Ibuprofen had no effect on reducing muscle damage, pain or performance on the second time trial. Ibuprofen does not promote recovery from intense endurance running or weight training. (Journal of Athletic Training, 50: 295-302, 2015)



INJECTED TESTOSTERONE TRIGGERS MOST CARDIOVASCULAR SIDE EFFECTS

LOW TESTOSTERONE IN AGING MEN IS LINKED TO PREMATURE DEATH, HEART DISEASE, ERECTILE DYSFUNCTION, DEPRESSION, DECREASED MUSCLE AND BONE MASS, AND DECREASED ENERGY LEVELS. This has triggered an avalanche of testosterone prescriptions that produced revenues of \$2.4 billion in 2013 and projected revenues of \$3.8 billion by 2018. Some experts are concerned about the cardiovascular safety of testosterone. A study led by J. Bradley Layton from the University of North Carolina at Chapel Hill found that some types of testosterone are safer than others. Researchers studied cardiovascular side effects in more than 500,000 men prescribed testosterone injections, patches or gels. Men taking injections had a higher risk of heart attack, angina (chest pain), stroke, hospitalization and death. The study did not assess whether testosterone supplementation was an appropriate medical treatment for every patient. (Journal American Medical Association Internal Medicine, 175: 1187-1196, 2015)

FDA INVESTIGATING THE RISKS AND BENEFITS OF TESTOSTERONE REPLACEMENT THERAPY

NEARLY 2.3 MILLION PRESCRIPTIONS FOR TESTOSTERONE WERE WRITTEN IN 2013. More than half of the men who received these prescriptions were also taking cardiovascular medications to treat blood clotting, high blood pressure, high cholesterol and chest pain. Two recent studies showing an increased risk of heart attack and stroke in men receiving testosterone supplements have initiated a full-blown investigation by a subcommittee of the U.S. Food and Drug Administration (FDA). The interaction of testosterone with these drugs is poorly understood. The committee suggested that the possibility of increased cardiovascular risk should be added to the drug's labeling. The committee advised that further studies be conducted to assess the cardiovascular risk of testosterone supplementation in aging men. (Journal American Medical Association, 313: 563-564, 2015)



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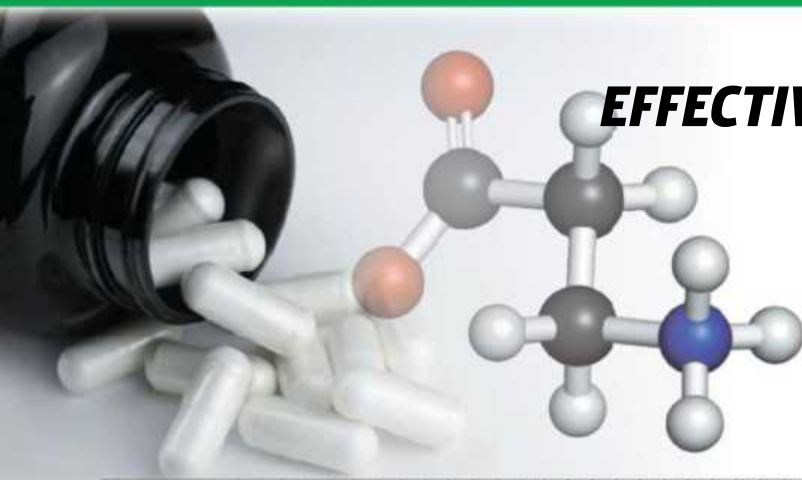
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BETA-ALANINE IS AN EFFECTIVE SPORTS SUPPLEMENT

ALANINE IS AN AMINO ACID THAT HELPS SUPPLY ENERGY DURING EXERCISE. It is converted to blood sugar in the liver by a process called the glucose-alanine cycle. While it is not used to synthesize muscle tissue or enzymes, it influences exercise capacity—particularly endurance performance. The International Society of Sports Nutrition, in a position statement, concluded that alanine increases muscle carnosine levels and acts as an intracellular buffer. Alanine is a safe supplement with few side effects. It improves exercise performance in exercise lasting one to four minutes. It reduces fatigue in older people, and may be particularly beneficial when consumed with other supplements such as creatine monohydrate. (Journal International Society Sports Nutrition, 12: 30, 2015)

Glutamine Interferes with the mTOR-Protein Synthesis Pathway

THE AMINO ACID LEUCINE IS THE KEY CHEMICAL SIGNALING MOLECULE THAT TURNS ON THE mTOR PATHWAY IN MUSCLE, WHICH IS RESPONSIBLE FOR MUSCLE PROTEIN SYNTHESIS AND GROWTH. Nutrition research shows that for optimal muscle growth, athletes should consume about 25 grams of high-quality protein that supplies about 3 grams of leucine. Many athletes consume glutamine supplements because they boost the immune system. The immune system has been called the ultimate limiting factor of performance in intensely training athletes. A Belgian study, however, found that glutamine suppresses the mTOR pathway and could interfere with muscle protein synthesis. Individual amino acid supplements can have unpredictable effects in athletes. (Amino Acids, 35: 147-155, 2008)

NITRATE SUPPLEMENTS

Improve Muscle Contraction

NITRATE SUPPLEMENTS, WHICH INCREASE NITRIC OXIDE LEVELS, IMPROVE CARDIOVASCULAR FUNCTION AT REST AND ENERGY METABOLISM DURING EXERCISE. Nitric oxide is a gas released by the inner lining of blood vessels that is critical for regulating blood flow and blood pressure. Georg Haider and Jonathan Folland from Loughborough University in the UK found that supplementing nitrates (beetroot juice) for seven days improved the contractile capacity of muscle in untrained people. It did not increase maximum strength and power, but the muscle changes could be beneficial in endurance exercise. Foods and supplements that increase nitric oxide production, such as citrulline and beetroot extract increase muscle blood flow. This could increase the delivery of nutrients during and after exercise, which could improve performance and promote recovery. Nitrate supplements might improve endurance performance by increasing efficiency, increasing tissue blood flow, and improving muscle contractile capacity. (Medicine Science Sports Exercise, 45: 2234-2243, 2014)



THE ANTAGONISTIC EFFECTS OF CAFFEINE AND TAURINE

IN 2013, WORLDWIDE SALES OF ENERGY DRINKS EXCEEDED \$50 BILLION. The principal ingredients of these beverages are typically caffeine, taurine and usually high fructose corn syrup. A study from Colombia found that identically tasting beverages containing either caffeine (80 milligrams), taurine (1,000 milligrams), a combination of caffeine and taurine, or a commercial energy drink (Red Bull) had no effect on cardiorespiratory fitness, endurance, strength, power or cognitive ability. Combining caffeine with taurine has antagonistic effects. For best performance results, skip the taurine in your energy or pre-workout drink. (Journal International Society Sports Nutrition, 11:44, 2014)

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SUPPLEMENT CUTTING-EDGE RESEARCH

L-Citrulline Improves Performance

CITRULLINE IS AN IMPORTANT AMINO ACID INVOLVED IN THE FORMATION OF UREA. It is a popular component in athletic food supplements because it participates in key amino acid reactions and influences blood flow by increasing nitric oxide levels. Nitric oxide is an important chemical secreted by the endothelium—the inner lining of the blood vessels. Stephen Bailey and colleagues from Exeter University in the United Kingdom found that citrulline supplements (six grams per day) improved resting blood pressure, accelerated oxygen uptake during exercise, improved endurance performance and enhanced tolerance to high-intensity exercise in healthy adults. Watermelon rind is an excellent source of citrulline. (Journal Applied Physiology, published online May 28, 2015)



Tyrosine Increases Mental Function During Heat Exposure

SEVERAL MONTHS AGO, WE REPORTED STUDIES SHOWING THAT SUPPLEMENTING THE AMINO ACID TYROSINE IMPROVED CONCENTRATION. Tyrosine is a precursor to dopamine, a brain chemical that controls thought processes. A study from the United Kingdom showed that tyrosine supplements improved mental effort and vigilance in soccer players subjected to a 90-minute simulated match in the heat. Many researchers believe that central nervous system fatigue is an important reason that performance decreases in athletes during prolonged exercise. Tyrosine may improve mental function during intense training and competition. (European Journal of Applied Physiology, 115: 373-386, 2015)

Excessive Antioxidant Consumption MAY SLOW TRAINING GAINS

ANTIOXIDANTS ARE CHEMICALS SUCH AS VITAMIN C AND VITAMIN E THAT REDUCE THE EFFECTS OF FREE RADICALS (REACTIVE OXYGEN SPECIES) THAT DAMAGE TISSUES, PROMOTE MUSCLE SORENESS AND SPEED FATIGUE. Consuming antioxidant supplements has been a natural nutrition fad for more than 30 years. Many popular foods contain added antioxidants to boost their sales. However, many recent studies found that high antioxidant supplement consumption in the diet suppresses muscle protein synthesis, and can reduce the positive effects of exercise training. An article by Laura Beil concluded that athletes are better off getting their antioxidants from natural foods found in fruits, vegetables and grains, rather than from supplements. (Science News, March 7, 2015)

High Green Tea Consumption Linked to Liver Cancer

CATECHINS ARE ANTIOXIDANTS FOUND IN FOODS SUCH AS GREEN TEA THAT BUFFER THE EFFECTS OF FREE RADICALS PRODUCED NATURALLY DURING METABOLISM. Free radicals are highly reactive and have been linked to DNA damage, inflammation and cell membrane destruction. Lesley Butler from the University of Pittsburgh Cancer Institute, and colleagues, in a study of more than 18,000 men, found that high levels of catechins were linked to markers of liver cancer in people who were prone toward the disease. Green tea extract is an extremely popular supplement for weight loss and boosting energy levels. Blood catechins increase in direct proportion to their consumption in the diet. Taking high doses of green tea extract could be deadly in high-risk people. The researchers noted that the incidence of liver cancer was much higher in China than in the United States. Green tea is a staple of the Chinese diet. High intake of green tea and green tea extract might be toxic to the liver. (American Journal of Epidemiology, 181: 397-405, 2015)

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PAIN RELIEVER TRAMADOL

Effectively Treats Premature Ejaculation

PREMATURE EJACULATION (PE) IS THE MOST SIGNIFICANT SEXUAL PROBLEM IN MEN. The anti-pain medication Rybix (tramadol) is effective for treating it— according to a review of literature led by Will Kirby from the Department of Urology at the University of North Carolina. Tramadol, taken when needed, increased time to ejaculation and improved sexual satisfaction. However, some studies have found that the drug only works for about eight weeks of treatment and is ineffective after that. Premature ejaculation is most prevalent in men aged 18 to 40. Factors increasing the risk of premature ejaculation include past history of sexually transmitted diseases or urinary tract infections, poor health, emotional stress, loss of income, past history of same-sex activity, history of sexual harassment and childhood abuse. Factors decreasing the risk of PE include daily alcohol consumption, circumcision and greater sexual experience. Tramadol might provide relief for this significant sexual problem. (International Journal Impotence Research, 27: 121-127, 2015)

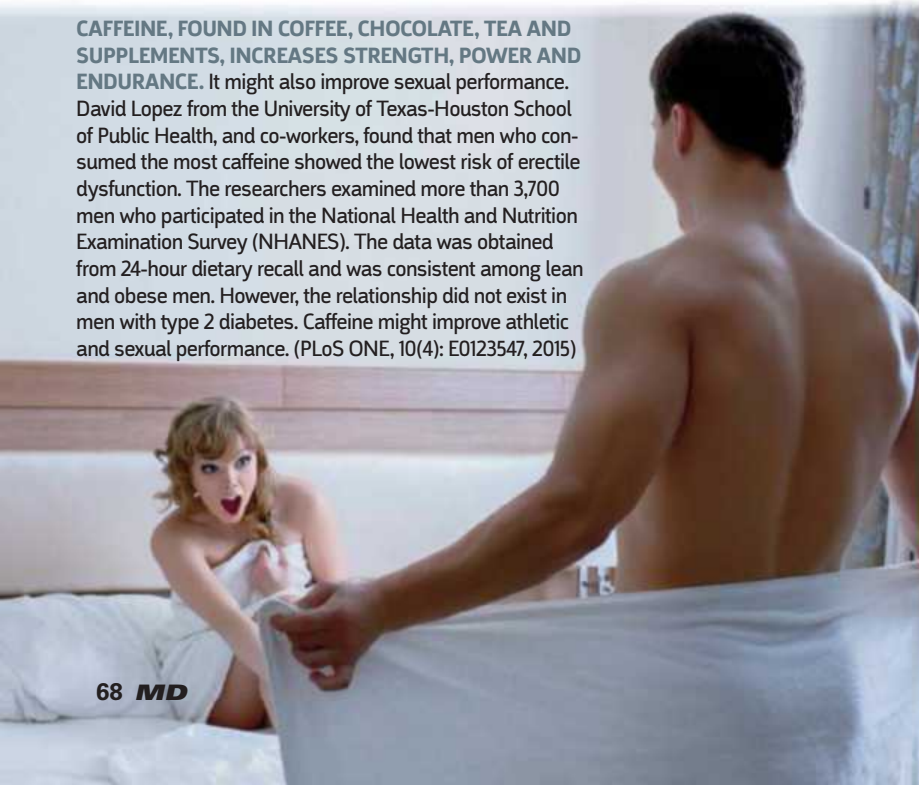


Frequent Ejaculation Reduces the Risk of Prostate Cancer

PROSTATE CANCER IS THE SECOND MOST COMMON CANCER IN AMERICAN MEN (SKIN CANCER IS FIRST). In 2015, cancer experts expect about 220,800 new cases of prostate cancer and 27,540 deaths from the disease. About 14 percent of men will be diagnosed with prostate cancer during their lifetimes. While regular exercise and consuming a healthy diet might reduce the incidence of the disease, scientists can't really point to any modifiable risk factors— until now. A study led by Jennifer Rider from Harvard University found that frequent ejaculation reduced the risk of prostate cancer. Researchers followed about 32,000 men for 18 years. Nearly 4,000 men developed prostate cancer and 384 of them died. Men who ejaculated 21 times a month reduced their risk of the disease by 20 percent. The most frequent ejaculators in the study were divorced men in their 40s. The best way to prevent prostate cancer is to have more sex— with a partner or by yourself. (Paper presented at the American Urological Association Annual Meeting (abstract PD6-07), May 15, 2015)

Caffeine Makes You Hard

CAFFEINE, FOUND IN COFFEE, CHOCOLATE, TEA AND SUPPLEMENTS, INCREASES STRENGTH, POWER AND ENDURANCE. It might also improve sexual performance. David Lopez from the University of Texas-Houston School of Public Health, and co-workers, found that men who consumed the most caffeine showed the lowest risk of erectile dysfunction. The researchers examined more than 3,700 men who participated in the National Health and Nutrition Examination Survey (NHANES). The data was obtained from 24-hour dietary recall and was consistent among lean and obese men. However, the relationship did not exist in men with type 2 diabetes. Caffeine might improve athletic and sexual performance. (PLoS ONE, 10(4): E0123547, 2015)



Key Findings From Brazil Sex Meeting

SEX RESEARCH HAS COME A LONG WAY SINCE ALFRED KINSEY FOUNDED THE KINSEY INSTITUTE FOR RESEARCH IN SEX, GENDER AND REPRODUCTION AT INDIANA UNIVERSITY IN 1947. At the 16th World Meeting on Sexual Medicine held in Brazil, scientists presented more than 250 studies. Highlights included:

- Injections of long-acting testosterone undecanoate four times a year reduced the incidence of erectile dysfunction (ED) and improved erection quality.
 - Testosterone replacement therapy had no effect on the initiation or progression of cardiovascular disease.
 - Shockwave therapy was effective for reducing ED.
 - Young men with low testosterone levels and inflammation had an increased risk of erection problems.
 - Erectile dysfunction is an important predictor of cardiovascular disease.
 - Testosterone therapy reduced waist circumference and body fat in men with low testosterone levels.
 - Clomiphene citrate and human chorionic gonadotropin were effective fertility treatments in men.
 - Coenzyme Q10 improved semen quality in men treated in fertility clinics.
 - Ninety-seven percent of patients were satisfied with a new penis-lengthening surgery developed at the Prince Sultan Military Medical City in Saudi Arabia.
- These studies were research presentations and do not carry the same weight as studies presented in high-quality, peer-reviewed journals. (Journal Sexual Medicine, 12(supplement 1): 1-96, 2015)

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VIAGRA INCREASES THE RISK OF MALIGNANT MELANOMA



MELANOMA IS AN AGGRESSIVE FORM OF SKIN CANCER THAT KILLS NEARLY 10,000 AMERICANS A YEAR. The widespread use of tanning beds has increased the risk of the disease. Stacy Loeb from New York University, and colleagues, found that use of the erection-promoting drug Viagra (sildenafil) increased the risk of the deadly disease by 20 to 80 percent. There was no association in men with multiple prescriptions, so there is some doubt whether Viagra actually caused the disease. Erectile dysfunction affects more than 300 million men worldwide, and Viagra is the drug of choice for many patients. Men taking these drugs should be particularly careful to use sunscreens, wear hats and avoid overexposure to the sun. (Journal of American Medical Association, 313: 2449-2455, 2015)

Viagra Has Variable Effects on Exercise Performance at Altitude

A STANFORD UNIVERSITY STUDY LED BY ANNE FRIEDLANDER FOUND THAT VIAGRA IMPROVED CARDIOVASCULAR CAPACITY DURING EXERCISE AT A SIMULATED ALTITUDE OF 12,710 FEET BUT NOT AT SEA LEVEL. Viagra increased cardiac output (blood pumped by the heart per minute), stroke volume (blood pumped by the heart per heartbeat) and oxygen saturation (percent of red blood cells carrying oxygen). Many athletes and the news media misinterpreted the results of the study. They promoted the idea that Viagra is a performance-enhancing drug at sea level that should be banned in sport, but no credible scientific evidence supports this. Roberto Peidro from the Center of Heart Health in Buenos Aires, Argentina found large individual differences in performance at altitude in response to Viagra, and that the effects differed at various altitudes. Viagra might improve aerobic exercise performance at altitude in some athletes because it decreases lung blood pressure. (Medicina, 75: 258-261, 2015)



Obstructive Sleep Apnea Linked to ED

SLEEP APNEA IS CAUSED BY AIRWAY OBSTRUCTION DURING SLEEP, WHICH DISTURBS SLEEP PATTERNS AND PREVENTS DEEP SLEEP. Sleep apnea leads to chronic inflammation and high blood pressure, both of which increase the risk of heart attack and stroke. German researchers, led by Roland Popp from the University of Regensburg, found a link between sleep apnea and erectile dysfunction. Oxygen saturation decreases during airway obstruction, which might disturb blood vessel health and promote inflammation. Sleep apnea is a serious health problem linked to cardiac arrhythmias, heart attack, diabetes, stroke, obesity and narcolepsy (day sleepiness). Weight loss and the use of continuous positive airway pressure can reduce blood pressure and C-reactive protein, a marker of inflammation. (Journal of Sexual Medicine, 12: 405-415, 2015)

ANTIDEPRESSANTS CAUSE SEXUAL PROBLEMS

DO YOU THINK YOU'RE DEPRESSED NOW? JUST WAIT TILL YOU TAKE ANTIDEPRESSANTS AND SEE WHAT IT DOES TO YOUR SEX LIFE. Iranian scientists, in a study on nearly 200 men and women, found that Prozac, Zoloft and Oleptro (fluoxetine, sertraline and trazodone) caused significant sexual problems, including decreased arousal and impaired orgasm. Prozac reduced sex drive in nearly 50 percent of users. Oleptro had the least effect on arousal and orgasm. Zoloft was in the middle, causing sexual impairment in 40 percent of users. Antidepressants can improve mood, but they can have severe effects on sexual performance and enjoyment. (General Hospital Psychiatry, published online October 30, 2014)



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2015 YEAR IN REVIEW

HIGHLIGHTING THE YEAR'S MOST SIGNIFICANT RESEARCH

Obesity has not gone away, though new discoveries are reported regularly in the scientific literature. There is hope that obesity in rats and mice will soon be eradicated, for those concerned about the well-being of rodents.

The direction of medical professionals is steered toward surgical procedures, such as gastric bypass or gastric banding, to reverse not only weight gain but also the adverse metabolic changes that accompany morbid obesity. It is surprising how quick clinicians have been to embrace gastric bypass surgery with little opposition, given the mortality risk of the procedure, though this is improving.¹ This is offset by a markedly reduced risk of approximately 50 percent in death and non-fatal cardiovascular events (e.g., heart attack and stroke).² Sadly, an increase in suicide has been noted, suggesting that while the procedure is effective for weight loss and metabolic change, there are other patient needs not addressed during evaluation and follow-up.³ Of course, for the person who is otherwise healthy and seeking to improve his/her body composition to meet personal goals, such procedures are not an option. However, as discussed in Muscular Development over the past year, many promising reports have emerged.

EXPANDING WAISTLINES AND FALLING TESTOSTERONE

The antagonist in the Fat Attack dialogue is obesity. In addition to the cosmetic effects that may affect one's social status or self-esteem, obesity also impairs metabolic health. In fact, through a complex concert of pathways, hormones, inflammatory signals and behavioral factors, obesity has been shown to lower testosterone (T).^{4,6} The relationship between T and obesity is a complex two-way street; losing weight has been shown to increase T in obese, hypogonadal men. Conversely, testosterone replacement therapy (TRT) has been shown to reduce body fat and waist circumference in men, with the improvement being an ongoing process over the period of at least two years, possibly more. Further, it has just recently been shown that men on TRT who had shown metabolic and anthropometric improvements lose those benefits when TRT is withdrawn.⁷ In this study, the withdrawal was due to a change in insurance drug coverage.

It is clear that most people could benefit in

regard to health, and the generally regarded standards of attractiveness, by reducing body fat stores and waist circumference. However, in the realm of bodybuilding, a statement with brutal impact was made by none other than Arnold himself during a symposium at the Arnold Classic. During an open dialogue, Arnold addressed the 800-pound gorilla topic—bodybuilders are no longer aesthetically pleasing.⁸

Arnold's specific complaint was the "big gut" dilemma, which has become a staple feature onstage since the early 1990s. Though human growth hormone (hGH) abuse has borne the brunt of the blame, it was shown how the dependence on insulin as an anabolic has likely fed this problem as well.⁹⁻¹¹ In an interview with six-time

Fat loss will always be an active area of research and discovery. Sadly, it remains to be seen if any widely effective treatment will aid in individual or societal fat loss without the burden of adverse reactions or addiction.

Mr. Olympia legend Dorian Yates, he noted how few people retain the "GH belly" after they stop competing. The concept of organomegaly suggests that the internal organs (e.g., heart, liver, intestines, etc.) grow in mass under the influence of hGH and its secondary messenger, IGF-1. This condition is seen in people with acromegaly or gigantism, persistent "natural" GH excess that begins in adulthood or childhood. It appears that whatever the reason for the "GH belly," it resolves to some degree after discontinuation of the markedly supraphysiologic doses used in bodybuilding.

GOOD NEWS AND BAD NEWS

Knowing some of the causes for obesity, or its effects, what about potential tools to improve fat loss? There was good and bad in the news. One of the more popular ingredients in fat-loss

supplements—DMAA—was removed from the market, following reports of injury and possibly death in users. Less well-publicized was ongoing research showing a connection between EGCG, a component in green tea extract (GTE), and liver injury.¹² EGCG or GTE have been suspected of potentially causing drug-induced liver injury (DILI) for many years. Though there are animal studies showing microscopic changes consistent with DILI from EGCG, human data is confounded by the multiple ingredients used in weight-loss products.¹³ Lawsuits have shown that EGCG-containing products have been associated with liver failure and death, from the usnic acid-containing product Lipokinetix to the more recent Hydroxycut cases.¹⁴ It is a complicated matter, as consumption of green tea as a brewed beverage is associated with health benefits and even liver protection. At this time, it appears to be wise to avoid products containing high concentrations of GTE or EGCG and consume green tea in its traditional form, if looking for health benefits while avoiding (or at least minimizing) potential for harm.

CONFUSION ABOUT L-CARNITINE AND PEA

Two other fat-loss topics also remain mired in a swamp of confusion as to their efficacy. L-carnitine is a transporter type of molecule that aids in getting fatty acids into the compartment of the cell (the inner membrane of the mitochondria), where they are consumed to produce energy. L-carnitine has been an ingredient included in multi-ingredient fat-loss formulations, but with little market success. Research has been minimally supportive, though it is becoming evident that supplementation may hold some value. Certainly, there are health conditions where supplemental L-carnitine appears to hold some value.¹⁵ However, in regard to fat loss, L-carnitine (in otherwise healthy people) appears to offer little benefit unless specific conditions are present. Before leaping ahead to the next paragraph, consider those conditions. L-carnitine appears to work best when fats are used for calorie burning, as opposed to being stored. This may include low-carbohydrate diets, ketogenic diets and in the presence of thermogenic drugs (e.g., sibutramine).^{16,17} All of these conditions increase the demand on fatty acid shuttling into the mitochondria to generate ATP, cellular energy.

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PEA and its related chemical cousins had become the rage, as they have the structural potential to increase beta-adrenergic stimulation—the process that accounted for much of ephedrine's potency. However, as an oral, PEA leaves much to be desired—as it is nearly completely metabolized prior to reaching the bloodstream.¹⁸ This, of course, led some supplement providers to alter the molecule, in the hopes it would be more effective. Kind of like making a drug ... well, exactly like making a drug. In reality, PEA will only work if dosed with a monoamine oxidase inhibitor drug, at a dose that would cause adverse effects in some (if not many) individuals; especially those with hypertension. Those seeking to “boost” PEA levels are actually better off if they supplement the amino acid precursor L-phenylalanine instead of taking PEA or its analogs directly.¹⁹

IRISIN: THE HOLY GRAIL?

Recently, a novel hormone-like messenger created in exercised skeletal muscle (in rodents) caused scientists a great deal of excitement. If the initial findings hold true in humans, this new myokine (muscle-derived messenger) called irisin appears to be the link between exercise and improved body composition (e.g., loss of fat and increase in muscle mass and/or function).²⁰ In mice, irisin is formed during exercise by cleaving a protein sitting within the membrane of muscle cells. The resulting fragment then circulates and induces a “browning” of white adipose tissue (WAT). White adipose tissue is the storage form of fat, the lumps and bumps people try to get rid of through diet and exercise. Alternately, the “brown” form of fat is a heat-producing, calorie-wasting tissue that holds great promise in combating obesity.

Papers were strewn out of labs measuring irisin in exercising animals and searching for this holy grail in humans. Though reports were encouraging and even exciting, the fever has abated as it has been revealed that much of the early research was flawed by the use of a non-specific measure.²¹ In fact, it has even been contested that irisin exists in humans—particularly as a metabolic signal of adaptation.²²

At this time, irisin remains front and center on the list of developments to watch, but expect delays, as early research is disputed until it is repeated using a specific measure of irisin. The hope for a biologic therapy based on irisin is very high, and new research is being published at a rapid pace. Of course, the Trans-Pacific Partnership, negotiated in absolute secrecy (even

from the members of Congress) seems to contain clauses determined to maintain maximum profitability for the companies developing such biologics. This means that if irisin is ever developed, it will be limited in supply and very expensive.

The bacteria in the gut, called the gut microbiome, have been discovered to be an unappreciated “organ” in human health and metabolism. There are very strong associations between changes in the microbiome and various health conditions, including weight gain and obesity. Imagine the ire of all the dieting public when they discovered that the artificial sweeteners that allow them to enjoy colas and other low-calorie snacks actually harm the gut microbiome, and convert the population to one that is more prone to insulin resistance and type 2 diabetes?²³ Best advice? Lay off the artificial sweeteners until more is known.

ACTIVATING BROWN FAT AND INCREASING CALORIE WASTING

Let's cap off the year with news of two supplements that may aid in weight loss by activating brown fat, thus increasing “calorie wasting.” Berberine was reported to stimulate thermogenesis in white and brown fat.²⁴ A reasonably well-tolerated supplement, berberine also has beneficial effects on cholesterol. It was exciting to see that berberine's effects on thermogenesis involved upregulation of the uncoupling protein UCP-1, as well as activation of the AMPK and PGC1- α pathways—known regulators of thermogenesis. This lends a great deal of credibility to the findings of the study.

Lastly, a novel effect of bile acids was revealed in the recent few years. Bile acids are capable of activating brown fat, turning on thermogenesis, through a novel receptor called TGR5. Wonderful for all those obese mice and rats we worried about earlier. Yet, a study just released revealed that chenodeoxycholic acid, a form available as a prescription and present in over-the-counter supplements, activates brown fat in adult humans after just two days of treatment.²⁵ Again, UCP-1 activity is increased, but even more exciting is the increase in type 2 deiodinase activity—the enzyme that activates the low-activity thyroid hormone T4 to the more potent form, T3.

Fat loss will always be an active area of research and discovery. Sadly, it remains to be seen if any widely effective treatment will aid in individual or societal fat loss without the burden of adverse reactions or addiction. ■

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2015 YEAR IN REVIEW

OPTIMAL NUTRITION FOR OPTIMAL MUSCLE GROWTH AND HEALTH

Optimal nutrition requires more than simply consuming the right nutrients. It turns out that optimal nutrition also has a lot to do with what you don't ingest, such as certain compounds that are typically found in the popular daily multivitamin. In addition, optimal nutrition also involves, in many instances, consumption of the right combination of certain nutrients in order to maximize their individual performance-enhancing effect. This past year has produced some noteworthy insight concerning some of these requirements for optimal nutrition, and we've covered them in great detail right here in Muscular Development. Here are a few of the more remarkable examples from this past year.

BCAA SUPPLEMENTS: SETTING THE RECORD STRAIGHT

The branched-chain amino acid (BCAA) is an amino acid with a side-chain consisting of covalently linked carbon atoms that form a branch-like structure, thus eliciting its name. There are three BCAAs found in the body: leucine, isoleucine and valine. Supplementing your diet with these three BCAAs has been very popular for quite some time, largely because of the apparent misunderstanding that all three BCAAs equivalently increase muscle growth. While each BCAA does promote muscle growth, they do not stimulate muscle growth to the same degree. In fact, it's not even close as leucine is, by far, the most potent stimulator of muscle growth while isoleucine and valine come in a very distant second and third place, respectively.^{1,2}

While isoleucine and valine do have ergogenic effects, they really should not be consumed with the hope of improving muscle size, and they definitely should not be simultaneously ingested with leucine—as this will produce antagonistic effects that diminish the performance-enhancing results associated with all three BCAAs.

One example of the incompatibility between isoleucine and leucine is the ability of isoleucine to increase the influx of glucose into the muscle cell and increase the rate at which glucose is converted into energy within muscle³, while leucine consumption only increases glucose influx into the muscle cell. After that, glucose is simply converted into glycogen for energy storage instead of being immediately burned for energy.⁴ The antagonistic influence of isoleucine and leucine on glucose metabolism within the muscle cell indicates that co-consumption of these two BCAAs is likely unproductive and should be avoided. Alternatively, the use of isoleucine and leucine at different times should generate superior performance enhancement—particularly if isoleucine use occurs before training to maximize energy production, and leucine use takes place post-workout to increase the anabolic response to training.

Valine intake with leucine also produces an antagonistic effect, as valine improves exercise performance by lowering production of the neurotransmitter serotonin during exercise by directly inhibiting transport of the serotonin-precursor tryptophan, resulting in a diminished conversion of tryptophan into serotonin.⁵ Since serotonin tends to bring about sluggishness and fatigue in the gym, the reduction in serotonin levels from valine intake enhances performance.

So, it seems pretty simple—take a handful of BCAAs containing valine before your workout to lower serotonin levels and reduce fatigue, and you'll be good to go. Well, unfortunately it's not that simple. As it turns out,

exercise-induced fatigue is actually influenced more heavily by the ratio of serotonin to another neurotransmitter, dopamine⁶, where higher serotonin to dopamine ratios increase fatigue. As a result, simply taking BCAAs will not reduce tiredness because BCAAs do more than simply lower serotonin. In fact, the BCAA leucine also prevents the uptake of the dopamine-precursor tyrosine into the brain, ultimately reducing dopamine production.⁷ Of course, this would counteract any positive effect that valine might have by reducing serotonin levels, as the simultaneous reduction in dopamine levels would reestablish a serotonin to dopamine ratio that promotes fatigue.

So, once again the antagonistic functions of BCAAs, in this case valine and leucine, reveals that co-ingesting them is unproductive and they should be consumed separately—with valine intake before exercise to optimally hinder pre-workout fatigue, and leucine after training to induce relaxation that promotes full recuperation.

So, it seems pretty simple—take a handful of BCAAs containing valine before your workout to lower serotonin levels and reduce fatigue, and you'll be good to go. Well, unfortunately it's not that simple.

COMBINE LEUCINE WITH CREATINE MONOHYDRATE

The muscle-depleting molecule myostatin resiliently impedes muscle growth by blocking several key anabolic processes such as the formation of new muscle fibers¹⁰ and mTOR-driven muscle protein synthesis.⁸ Because of the extraordinary capacity of myostatin to keep muscle growth in check, the slightest reduction in myostatin activity will likely generate notable gains in muscle growth. While many reports in the scientific literature clearly show the independent muscle-building effects of leucine and creatine monohydrate, the combined use of both compounds has only recently been shown to reduce the negative influence of myostatin on muscle growth. In fact, one study by Mobley et al.⁹ showed that a mixture containing leucine and creatine monohydrate reversed myostatin-induced atrophy in

isolated muscle cells by preventing the inhibition of newly formed muscle fibers, indicating that the combined use of leucine and creatine should promote considerable muscle growth.

ADVANCED PERFORMANCE AND HEALTH WITH THERMO HEAT MULTI

The multivitamin and mineral supplement was intended to fill the significant nutritional void in today's diet to promote better health. However, recent scientific evidence indicates that many multivitamin and mineral products on the market today may actually impede overall health by supplying an excessive amount of certain micronutrients, such as iron, copper and manganese—that can increase oxidative stress and chronic inflammation, contributing to the onset of the many types of certain life-threatening diseases

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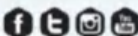
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such as diabetes, cardiovascular disease and cancer, which have increased significantly within the past century.¹⁰

In addition to their potentially negative impact on health, multivitamin and mineral products available today are typically unable to function as a performance enhancer. Unlike the standard multivitamin, the recently released Thermo Heat Multi from Advanced Molecular Labs actually extinguishes destructive oxidative stress and chronic inflammation, promoting superior health while also enhancing exercise performance.

REDUCE OXIDATIVE STRESS AND INFLAMMATION

Thermo Heat Multi contains a blend of vitamins that have demonstrably been shown to enhance health and wellness. Included in this blend is the fat-soluble vitamin A that has potent anti-inflammatory properties, suppressing the expression of pro-inflammatory agents such as IL-6 and increasing the secretion of anti-inflammatory cytokines.¹¹ Thermo Heat Multi has plenty of antioxidant support in vitamin C and vitamin E, which chemically neutralize free radicals and other oxidizing agents.¹²

INCREASE MUSCLE PERFORMANCE

Thermo Heat Multi contains several unique compounds that enhance performance in the gym, with the most prominent being vitamin D, or more precisely vitamin D3, which is the more active form of vitamin D in the body.¹³

Vitamin D is unique because it promotes overall health like other vitamins, while also improving muscle growth and exercise performance. Some of the health benefits associated with vitamin D include greater absorption and metabolism of calcium and phosphorous for improved bone health. In addition, low levels of vitamin D correlate with several diseases such as cancer¹⁴, cardiovascular disease¹⁵ and obesity¹⁶, indicating the requirement of vitamin D intake to prevent these disorders.

Some of the muscle-building properties associated with vitamin D come from directly binding and activating the androgen receptor in a similar fashion to testosterone, which consequently turns on several anabolic genes that powerfully drive muscle growth.

THERMO HEAT MULTI IS LOADED WITH THERMOGENIC COMPOUNDS THAT TORCH BODY FAT

Thermo Heat Multi also has a unique blend of compounds, known as capsaicinoids, that increase energy expenditure by a process known as thermogenesis—promoting fat loss, especially when added to a good exercise routine. In fact, studies have shown that capsaicinoids not only trigger thermogenesis and fat loss, but also increase the levels of the thermogenic brown adipose tissue, facilitating greater levels of thermogenic energy expenditure and fat loss.¹⁷ Capsaicinoids have also been shown to reduce food intake¹⁸, giving them the combined capacity to increase energy expenditure

and fat oxidation while reducing energy intake, providing a surefire way to lose body fat and keep it off.

For more information about Thermo Heat Multi, visit advancedmolecularlabs.com. ■

For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a research scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK—leading to numerous publications in peer-reviewed journals including the journal *Nature*. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.

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SUPPLEMENT SCIENCE REVISITED



The year 2015 was one filled with numerous advances in supplement and nutritional sciences. We discovered some new compounds and challenged their science. We reexamined old supplements and found some to be questionable in efficacy and cost-effectiveness. In this column, we will revisit the 2015 science on the importance of leucine, HMB, whey protein and nighttime feedings. We discussed the importance of omega-3 fatty acids, caffeine and other novel compounds in this column over the past year. As you will see, there's a need to stay up-to-date on supplement science.

The supplement industry is one that is loaded with bias and a desire to create science to support marketing. One must be very critical of labels and the science that they purport to back them. Randomized, double-blinded, placebo-controlled studies are the gold standard, and the Federal Trade Commission (FTC) and U.S. Food and Drug Administration (FDA) would like you to have these high-quality studies to back your claims.

Unfortunately, you can't use claims from studies on disease states. For instance, if UCII has been shown to reduce joint pain and stiffness in subjects with rheumatoid arthritis, one can't make this claim on a label.¹ We can't expect that everyone reading MD has the skill or knowledge base to review this kind of literature. Thus, *supplement performance* is meant to break this down and we will continue doing it in 2016.

THE LEUCINE FACTOR

We started 2015 discussing the compounds that I felt showed the best evidence for building muscle in the new year. We started the discussion with the importance of high-quality proteins rich in the branched-chain amino acid

(BCAA) leucine. My book, *The Leucine Factor Diet* (amazon.com), lays out how leucine is the anti-kryptonite or anti-sugar that turns on muscle growth and insulin sensitivity, boosting metabolism and your performance in the gym. All proteins are not created equal, and some have more leucine per gram of protein than others. Learn to build a diet that delivers 0.02 grams of leucine per pound of bodyweight per meal, at five meals per day, to optimize muscle growth and metabolism.²

We discussed at length how the leucine breakdown product HMB, beta-hydroxy-beta-methylbutyrate, can help build and maintain muscle. It too has the ability to turn on mTOR and build muscle like leucine. However, HMB also has the ability to limit protein breakdown, which may be of special importance in times of caloric restriction like contest prep.³ We discussed the conflict in the literature between the "free acid" form (Clear Muscle) and the calcium HMB form.⁴ This is definitely a case where industry likely got in the way of science. At this time, I still recommend the affordable calcium HMB form at up to three grams per day to maintain muscle mass in my dieting clients.

CAFFEINE, EXERCISE PERFORMANCE AND RECOVERY

We spent some time discussing the importance of caffeine in exercise performance and recovery. We know that caffeine consumed before training improves performance in both high-intensity weight training and endurance races.⁵ In 2015, we explored studies in animals and isolated muscle preparations that have provided some insight into how caffeine enhances performance.⁶ At physiological concentrations, caffeine appears to increase the ability of muscle to produce work, force and power. It may even be that caffeine increases the performance of slow-twitch endurance muscle fibers two times faster than fast-twitch strength fibers (increased by 6% and 3% respectively). This may be an explanation for improvements in endurance training and competition. Furthermore, caffeine appears to spare muscle glycogen and improve partitioning of post-workout carbohydrate into muscle glycogen, when consumed both before AND after training.

We also previously discussed a multidirectional approach to improving mobility

The supplement industry is one that is loaded with bias and a desire to create science to support marketing. One must be very critical of labels and the science that they purport to back them.

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WHEY AND PEA PROTEIN FOR BUILDING MUSCLE

Although we have emphasized the importance of whey protein for building muscle, we have also explored the benefits of other proteins supported by research in 2015. For instance, new science supported the recommendation to consume up to 30 grams of casein before bed to boost muscle protein synthesis.⁹ When combined with resistance exercise and 15 grams of carbohydrate, this evening casein supplementation significantly augmented both strength and muscle mass over a 12-week treatment period when compared against a placebo. However, this wasn't compared to whey protein and whey may intuitively work just as well from a leucine-delivery perspective.

In 2015 we did see a new comparison of pea protein isolate to whey protein concentrate. A study from France compared the effects of pea protein supplementation to whey protein concentrates on muscle responses to a resistance-training protocol.¹⁰ The protocol supplemented 25 grams of whey, pea or placebo twice daily over a 12-week weight-training period in participants who were new to building muscle. The pea protein seemed to be as effective in increasing arm muscle size without significant differences, compared to the whey protein concentrate. Pea protein isolate contains 6.4 grams of leucine per 100 grams, while whey concentrates have 8.6 and isolates have up to 12 grams of leucine per 100 grams of total protein. Why the study didn't compare isolates to isolates is beyond me; oh, wait ... the pea protein manufacturers supported the study. Why make the fight fair?

PHOSPHATIDIC ACID AND OMEGA-3s

We also thought earlier in the year that 2014 phosphatidic acid (PA) research supported a promising way to boost muscle protein synthesis with supplementation, as stated in January MD. However, follow-up in 2015 looked for a synergistic effect on mTOR

activation by combining whey protein with PA.¹¹ While PA and whey plus PA both showed the ability to turn on mTOR, this didn't correlate to enhanced muscle protein synthesis in the whey plus PA-supplemented animals. In fact, the PA seemed to reduce the production of muscle proteins compared to whey supplementation alone. All that being said, this was a short-term rat study and myostatin levels actually decreased with PA combined with whey. Given more time and a human study, might PA still work to build muscle through myostatin suppression? Look forward to more human studies in 2016.

In 2015, there were also a couple of studies that suggested that all bodybuilders should be supplementing their diets with omega-3 fatty acids; preferably fish oil-derived EPA and DHA. EPA appears to be able to improve the ability to burn fat and reduce the size of fat cells.¹² Furthermore, scientists performed a randomized placebo-controlled trial of eight weeks where they supplemented subjects with 720 milligrams of EPA and 480 milligrams of DHA per day.¹³ Amazingly, the omega-3 supplementation not only improved the low IGF-1 levels in patients, but it also increased the bioavailability of the IGF-1 by decreasing levels of the IGF-binding protein. In a chronically stressed state of high-intensity training with or without a lack of sleep, a boost in IGF-1 could potentially augment muscle-building recovery just like boosting growth hormone levels.

MODERATE ALCOHOL CONSUMPTION

As a bodybuilder who enjoys a nice glass of wine now and then—for cardiovascular health, of course—there's 2015 science that relieves my anxiety over losing gains. Chronic excessive alcohol consumption can lead to muscle weakness and atrophy, in part by suppressing muscle protein synthesis and mTOR signaling. However, scientists wanted to determine if this suppression could be overcome by weight training.¹⁴ Thus, they overloaded mice calf muscles and looked to see if alcohol suppressed the stimulation of muscle growth through mTOR. Luckily for those who like a little vino, muscle protein synthetic response from overload was not affected by moderate alcohol consumption in mice. Everything in moderation, including moderation.

One more study in 2015 that may show some follow-up in 2016 presents us with a new compound for bodybuilders to keep an eye on.¹⁵ Obacunone is a compound that is predominantly found in citrus fruits and seeds. The biological activity of obacunone is still being explored, but a recent study suggests it may help bodybuilders. Compared with control (placebo) feeding, obacunone-fed mice had better blood glucose control, lower

fat tissue weight and significantly increased the weight of the gastrocnemius and quadriceps muscles. These results suggest that obacunone stimulates muscle growth and reduces body fat. Will it work in humans? Stay tuned in 2016. ■

Dr. Victor Prisk is a board certified orthopaedic surgeon and IFBB professional bodybuilder in Pittsburgh, PA. Dr. Prisk is an active member of the GNC Medical Advisory Board and creator of the "G.A.I.N. Plan." He is an NCAA All-American gymnast, champion swing dancer and NPC Welterweight National Champion.

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2015 YEAR IN REVIEW

THE DANGERS ASSOCIATED WITH PED USE

While packing on muscle mass and gaining strength can be incredibly satisfying, using performance-enhancing drugs (PEDs) to achieve this goal is simply just not worth the risk— as many of these drugs can have an extremely negative impact on your health, ultimately resulting in premature death. So, this past year, Muscular Development has made a considerable effort to highlight many of the dangers associated with these drugs— while promoting the use of safer performance-enhancing supplements that, although not as potent, still provide a powerful anabolic impact without the negative side effects associated with PEDs.

DYING TO GET BIG!

A primary cause for the increased health risks associated with the contemporary use of PEDs has to do with the simultaneous use of many different types of PEDs that will wreak havoc on the body, producing poor health, thus increasing the odds for premature death. The standard cocktail of PEDs consumed today usually includes heavy doses of different kinds of anabolic steroids in combination with other powerful anabolic agents such as human growth hormone (GH) and insulin.^{1,2} While this mix of PEDs may improve your physique in the short term without manifesting disease, the harsh reality is that over time, the repetitive use of these drugs will break your body down— potentially causing a plethora of disease that will most definitely result in premature death.

THE PERILS OF ANABOLIC STEROID USE

The most heavily consumed PED is the anabolic steroid. Elite bodybuilders have been using this form of PED to build muscle mass and strength for quite some time now. In fact, the use of anabolic steroids has likely increased over time, as one study investigating the use of PEDs by competitive bodybuilders showed that 77 percent of the respondents reported using anabolic steroids.³ While anabolic steroid use is very high among top-flight bodybuilders, the truth is the vast majority of PED users are not elite bodybuilders, or athletes, but rather individuals focused on simply wanting to look leaner and more muscular.³

The reason for the widespread consumption of anabolic steroids is they do, indeed, potently stimulate muscle growth and strength. The primary anabolic effect from anabolic steroids is caused by cranking up the synthesis of certain protein molecules within the muscle cell that promote muscle growth and strength. Of course, the positive influence on muscle growth from anabolic steroid use does not come without negative side effects, as anabolic steroids also trigger protein synthesis in non-muscle cells, such as the prostate, which promotes the unwanted enlargement of the prostate gland, increasing the chance for prostate cancer.

Anabolic steroids have also been shown to dramatically impair cardiac function by pathologically increasing cardiac muscle hypertrophy, which decreases the capacity of the heart to pump blood throughout the body.^{4,5} In addition to the undesirable effects of anabolic steroids on the function of cardiac tissue, some steroids, especially the 17-alpha-alkylated anabolic steroids like Anadrol⁶, reduce the levels of high-density lipoprotein cholesterol (the “good cholesterol”)

while increasing low-density lipoprotein cholesterol levels (the “bad cholesterol”), which is a well-established profile for developing cardiovascular disease.⁷ As if the aforementioned side effects are not enough, a few additional, yet less severe, adverse health effects also seen in anabolic steroid users include infertility, gynecomastia, sexual dysfunction, acne and testicular atrophy, which altogether further stress the considerable danger associated with the use of these incredibly powerful drugs.

GH INDUCES INSULIN RESISTANCE, RESULTING IN THE USE OF MORE DRUGS

The second most common PED that has also been used for an extensive period of time by those dying to get big is human growth hormone (GH). Human growth hormone is a protein molecule secreted by the anterior pituitary gland that functions by binding to the growth hormone receptor found on the cell surface of many different organs and tissues within the body. The binding of GH to the receptor triggers biochemical signaling cascades that powerfully stimulate an anabolic environment that supports greater muscle growth, while also promoting fat loss.

To date, there have been no systematic studies of the adverse effects of GH use. So, much of the information about the potential adverse effects from GH use in the supraphysiologic range has been deduced from studies of patients with acromegaly, a disease caused by excessive GH production, resulting in abnormal growth of the hands, feet and face. The high GH levels in these patients also typically leads to hypertension, congestive heart failure, cardiomyopathy, increased insulin resistance, diabetes and even increased mortality.⁸

So, one might conclude that all of these negative health effects associated with GH use would deter, if not completely stop, the use of this drug just to get bigger muscles. Regrettably, that has not been the case. In fact, the shocking reality is that instead of discouraging the use of GH, this knowledge has actually led to the use of additional drugs, such as metformin, to mitigate some of the ailments associated with GH use, such as insulin resistance and diabetes. Metformin is able to minimize the increase in blood sugar due to insulin resistance by suppressing the production of glucose by the liver, while also restoring the insulin-signaling response to some degree. Obviously, trying to prevent an adverse side effect from the use of one drug by consuming another drug, especially without the advice of a physician, is extremely dangerous and should be completely avoided.

The harsh reality is that over time, the repetitive use of these drugs will break your body down— potentially causing a plethora of disease that will most definitely result in premature death.

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MUSCLE GROWTH *update*

METFORMIN REDUCES TESTOSTERONE PRODUCTION AND FUNCTION

Furthermore, not only is it a bad decision to use metformin without the guidance of a physician, but it appears that the use of metformin to mitigate GH-driven insulin resistance is an even worse decision, when considering a recent study has shown that metformin actually impedes the muscle-building hormone testosterone.

In fact, this study revealed that consuming 850 milligrams of metformin twice a day for two weeks had several negative influences on testosterone in healthy young male subjects.⁹ The first adverse consequence being a reduction in total testosterone levels and the second, more deleterious, consequence being a decrease in the biologically active form of testosterone, which is the form of testosterone that stimulates muscle growth. Altogether, this means that metformin not only reduces testosterone levels but also reduces the muscle-building activity of any testosterone that is still being produced.

A STEROID ALTERNATIVE WITH MUSCLE-BUILDING POTENTIAL AND NO SIDE EFFECTS

As a potential alternative to anabolic steroids, a class of compounds known as ecdysteroids, that are naturally produced in many different organisms including the insect¹⁰, have also been shown to effectively promote anabolic muscle growth with essentially no androgenic or estrogenic side effects.^{11,12,13} Moreover, human consumption of ecdysteroids has been shown to influence several physiological functions that enhance muscle size with essentially no adverse side effects, making them an attractive alternative to anabolic steroids. ■

For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a research scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK—leading to numerous publications in peer-reviewed journals including the journal *Nature*. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.

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2015 YEAR IN REVIEW

HIGHLIGHTING THE YEAR'S MOST SIGNIFICANT RESEARCH

Training is both a science and an art. The “art” of training is based on personal expertise and takes individual needs and abilities into account. However, despite the claims that experience trumps all, you can't separate the art of training from its underlying science.

Research should always guide our decision-making. The scientific method that is employed in research protocols provides an objective, systematic approach to investigating a given topic. Once you have a grasp of the body of research, you should then use your experience to customize an approach that maximizes muscular development.

As a researcher and educator as well as a trainer of high-level bodybuilders, I'm fortunate to work on both ends of the fence. Research into the science of exercise continues to evolve in ways that improve our ability to take muscle building beyond the realms of what was previously thought possible. What follows is a roundup of some of the research I've been involved in over the past year. This includes studies carried out in my lab, as well as collaborations with colleagues from around the globe. I've provided an overview of the findings from these cutting-edge studies as well as the take-home practical implications that can be applied to your training approach. Consistent with an applied science such as exercise, the devil is almost always in the details.

- *Muscle growth can be achieved by using a fairly wide range of repetition durations.* There has been no clear recommendation as to how fast you should lift to maximize hypertrophy. We carried out a meta-analysis of all studies that investigated performing reps at different velocities.¹⁰ A total of eight studies were identified that met the inclusion criteria. The results of these studies were then pooled for comparison. Statistical meta-analysis showed that performing reps with a duration up to six seconds made no significant difference in the amount of muscle gained. From a practical standpoint, this implies that reps performed at a speed where the concentric and eccentric portions last one second each (i.e., 1-0-1) are equally as effective as those lasting three seconds (i.e., 3-0-3) if the primary goal is to maximize muscle growth. However, reps performed at very slow cadences (>10s per repetition) were found to produce inferior results from a hypertrophy standpoint. This is apparently due to

a reduced activation of the target muscles during both concentric and eccentric actions.²

Take-home message: Choose a rep velocity that allows you to establish a good mind-to-muscle connection within a range of one to three seconds for the concentric and eccentric portions of the lift. Don't go too slow, however; it has no additional benefit and may in fact be counterproductive to muscle growth.

- *Both light and heavy loads produce significant increases in hypertrophy.* It's often claimed that light weights don't build appreciable muscle due to insufficient activation of strength-related type II fibers. To test this hypothesis, we recruited 18 well-trained young men to carry out a resistance-training program using either a high (25-35) or moderate (8-12) rep range.¹¹ All other aspects of the program were controlled. Subjects performed three sets of seven different exercises covering all the major muscle groups. Training was carried out three days per week for eight weeks. All sets were taken to the point of concentric muscular failure. When tested at the end of the study period, there were no significant differences in hypertrophy between groups. On the surface, this indicates that you can train across a wide array of rep ranges to gain size, provided training is carried out to muscular failure. However, recent research out of Russia shows that the hypertrophic response to training in different loading zones may be fiber type-specific.^{4,7} Specifically, lighter-load training appears to result in a preferential increase in type I muscle fiber size while training with heavier

loads seems to have a greater influence on type II fiber growth.

Take-home message: Lifting throughout a spectrum of rep ranges (heavy, moderate and light) would seem to maximize growth of all the fibers in a given muscle, so train with a variety of loads over time.

- *Training more frequently can enhance muscle growth.* A recent survey of 127 bodybuilders found that every single one used a split routine, and more than two-thirds trained each muscle group only once per week.¹ To determine the effects of resistance training frequency on muscle hypertrophy, we recruited 20 well-trained young men to train on either a three-day split or total-body routine.¹² Those in the split routine performed chest and back on Day 1, lower body on Day 2, and shoulders and arms on Day 3. Alternatively, the full-body routine consisted of performing one exercise for all the major muscle groups during each session. Training was carried out three days per week for eight weeks. Total weekly volume was equated between routines so that any differences in muscle development could be attributed directly to the effects of training frequency. When tested at the end of the study period, those performing the full-body routine achieved greater increases in arm and leg muscle growth, compared to the split routine. These findings indicate a hypertrophic benefit to training a muscle more often over the course of a week. Here's a caveat, though: This assumption is based on an equated volume between conditions. A primary benefit to training with a split routine is that it allows more



The leg curl should be considered an essential exercise for maximizing growth in the lower part of the hamstrings.



Research into the science of exercise continues to evolve in ways that improve our ability to take muscle building beyond the realms of what was previously thought possible.

volume to be packed into workouts over the course of a week. Given that higher training volumes are positively associated with greater muscle hypertrophy^{3,8}, a split routine remains a viable option for maximizing muscular gains.

Take-home message: Periodize your routine so that it has cycles where muscles are trained three times a week using total-body routines, and intersperse cycles of split-body routines that involve high-volume sessions with muscles trained less frequently per week.

• *The upper and lower hamstrings can be activated by using different exercises.* Theory has long held that muscle fibers always spanned from origin to insertion. Based on this supposition, it was generally assumed that fibers are activated as an entire unit along the full length of the muscle. To the contrary, however, more recent evidence has shown that most muscles are actually compartmentalized, so that fibers terminate within the fascicle, with the fiber subdivisions innervated by their own nerve branch. This partitioned structure provides a basis whereby exercises can conceivably target the individual subdivisions within the muscle.

To test this hypothesis, we recruited 10 young men with extensive experience in resistance training to perform both the lying leg curl and the stiff-leg deadlift to failure, at a load equating to their eight-repetition maximum (8RM).⁹ Muscle activation of the upper and lower aspects of the hamstrings was tested by electromyography, which provides a gauge as to the neural drive to a working muscle. While the level of activation was similar between exercises for the upper hamstrings, the lying leg curl produced markedly greater lower hamstrings activity.

Take-home message: The leg curl should be considered an essential exercise for maximizing growth in the lower part of the hamstrings. That said, there were large inter-individual differences in activation patterns between subjects; some exhibited considerably greater upper EMG amplitude with the stiff-leg deadlift, while others showed much higher activation from the lying leg curl. Thus, performing a combination of knee flexion and hip extension is the best way to ensure complete development of the hamstrings. ■

Brad Schoenfeld, Ph.D., CSCS, FNSCA is widely regarded as one of the leading authorities on training for muscle development and fat loss. He has published over 80 peer-reviewed studies on various exercise- and nutrition-related topics. He is also the author of the best-selling book, *The MAX Muscle Plan*, and runs a popular website and blog at www.lookgreatnaked.com.

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MD EXCLUSIVE INTERVIEW

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DEXTER JACKSON

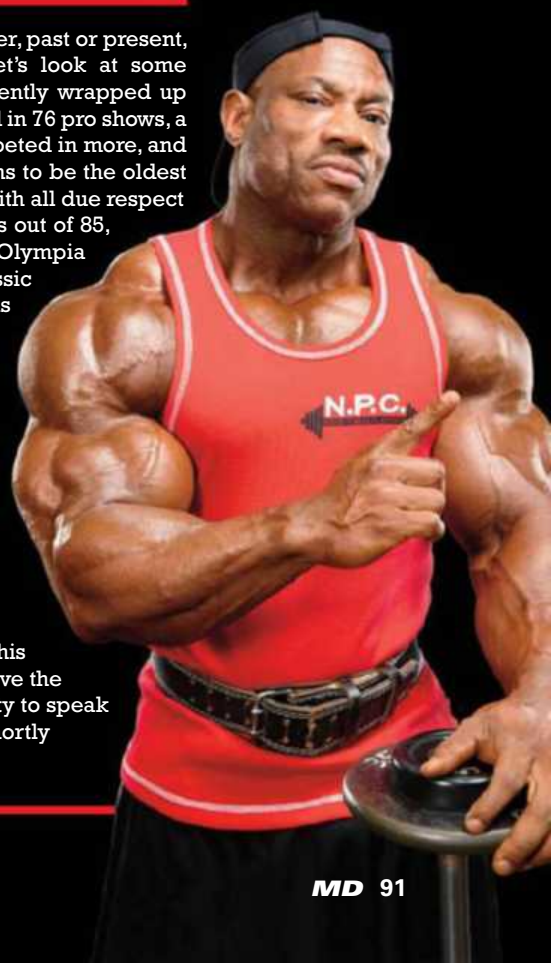
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AGELESS WONDER



It would be hard to argue that any pro bodybuilder, past or present, has had a better career than Dexter Jackson. Let's look at some statistics. Dexter turned pro back in 1998, and recently wrapped up his 17th season competing in the IFBB. He's competed in 76 pro shows, a record in the modern era. Only one other man competed in more, and that was "Ageless" Albert Beckles, who also happens to be the oldest man to win a pro show in 1991 at the age of 52. But with all due respect to Beckles, he only managed to win eight pro shows out of 85, and never won the Olympia. Dexter did win the Mr. Olympia in 2008, and set the all-time record of Arnold Classic wins earlier this year at five. The Blade's total pro wins now tally 24. Only one man ever won more, and that was Ronnie Coleman with 26. The thing is, Ronnie retired years ago and Dexter is still going strong. This year, at the age of 45, he won four shows alone!

As of November 25, 2015, Dexter is 46 years old. Not only is his longevity in the sport astounding, but also his consistency is unparalleled. At an age where nearly all other pro bodybuilders have either long since rode off into the sunset or are hanging on as shadows of their former selves who don't realize their time is gone, Dexter Jackson is still kicking ass and taking names. The man just came damn close to beating Phil Heath and getting his Olympia title back seven years later. He's a man I have the deepest respect for and always enjoy the opportunity to speak with for the MD readers, and I caught up with him shortly after he wound up the 2015 contest season.





an opportunity with Jay as the champion at the time. He didn't seem to be getting better. He was getting worse. And I knew that if Jay tried to match me on condition for the 2008 show, he would lose some of the size that made him so dominant, and I would beat him. That's exactly what happened. Since I won, the Olympia hasn't been a big man's show, really. Phil has plenty of mass, but he doesn't have the height and the overwhelming factor like Ronnie, Dorian and Lee Haney did. Maybe a big guy will come along soon and bring it back to that, who knows?

I want to put your longevity into perspective for the MD readers, in terms of the other Mr. O champs.

Lee Haney competed for nine seasons as a pro, from 1983 to 1991. Dorian's pro career was even briefer, eight years from 1990 to 1997. Ronnie competed from 1992 to 2007, 16 seasons, while Jay had 15 seasons from 1998 to 2013, as he took off all of 2012. You just wrapped up your 17th season in the IFBB, and you've never missed a year. You've competed in 76 pro shows. How in god's name have you not burned-out yet, mentally, physically or both?

I think it's because I didn't have to do a lot of the stuff that most of the other guys did. For many years I didn't do any cardio at all, and even now I just do 30 minutes a day in my prep. Other champs have had to do as much as two to three hours of cardio, and that takes a toll on the body just like the weights do. I have always kept my workouts shorter and I took full rest days. My workouts would be 60-90 minutes long, and I spent many years training only three or four days a week.

You are different in many ways from most other bodybuilding champions. The last four Mr. Olympia winners before you earned the title in 2008, going back all the way to Lee Haney in 1984 and including Dorian, Ronnie and Jay, all started competing at over 200 pounds. In the case of Lee and Jay, they were heavyweights even in their first contests as teenagers. Yet you are famous for starting out back in 1991 as a 135-pound bantamweight. You added over 100 pounds of quality muscle after you won your first overall title. Can you think of anyone who's accomplished anything remotely close to that in terms of mass gains since they began competing?

No one else has done that, and I think it's why a lot of guys feel like they can identify with me a little more. I wasn't huge from the start. It took me a long time to get as big as I am now.

People talk about your longevity in the sport and rightfully so, but your persistence is equally impressive. No man who ever won the Mr. Olympia ever took as many attempts to win— nine— as you did. Yet until that last one where you did win, is it true that you never believed you could win because you always thought of the Olympia as a big man's contest? And do you still think it is?

The Mr. Olympia was a big man's show for a very long time, but I saw

AT AN AGE WHERE NEARLY ALL OTHER PRO BODYBUILDERS HAVE EITHER LONG SINCE RODE OFF INTO THE SUNSET OR ARE HANGING ON AS SHADOWS OF THEIR FORMER SELVES WHO DON'T REALIZE THEIR TIME IS GONE, DEXTER JACKSON IS STILL KICKING ASS AND TAKING NAMES.

That gave my body three or four full days to recover. After contests, I have always taken a full two months off when I don't go near a gym. So you could say I paced myself. Your body can only go at full throttle for so long before it breaks down. Taking your foot off the gas and coasting for a while is essential if you want to keep doing all this for many years. I recognize that my genetics and my metabolism have played a big part. I never went up and down 30-40 pounds once or twice every year like some other guys. And I do love training. I will train until the day I die. As long as the fire is burning and I love what I do, I can keep going.

I don't want to make this all about your stats, but you do have some nice ones. You have the record of Arnold Classic wins at five, and you only need two more pro wins to tie Ronnie's record of 26, then one more to beat that. That's pretty likely to happen before you hang it up. The only record you won't get is Mr. Olympia wins. Do you wish you had more than one Mr. O title, or are you satisfied with that one considering everything else you've accomplished in the sport?

I am satisfied to have one, but I would still love to get another one. It's the toughest contest in the entire sport, and only 13 men have ever won it. That's a very small and elite group to be part of. And I also know it was a fluke that I won in 2008. If Jay had come in at his best that year like he did the year after that, I wouldn't have beaten him. If I retire with one Mr. Olympia title, five Arnold Classic titles and maybe the most pro wins of all time, I would be plenty happy with that.

Your son Dexter Jr. plays professional arena football for the Tampa Bay Storm. I imagine his training is very different from what you do. Still, do you ever train together?

We never have. We both have busy schedules, and I am out of town so much. We mainly see each other at holidays like Thanksgiving and Christmas, and I'm not working out then. But he's funny. He'll call me up and say, "Hey dad, I got 315 on the bench for five today!" I tell him that's cool, let me know when you get 405 for 12 like I did.

Your daughter Myah is also a standout athlete, having played basketball for the U.S. Air Force. You mentioned almost a year ago that she was starting to show an interest in possibly competing in Figure. Has there been any progress with that?

No, she's focused on doing well in basketball and finishing up her school. After that she goes off to serve in the Air Force.

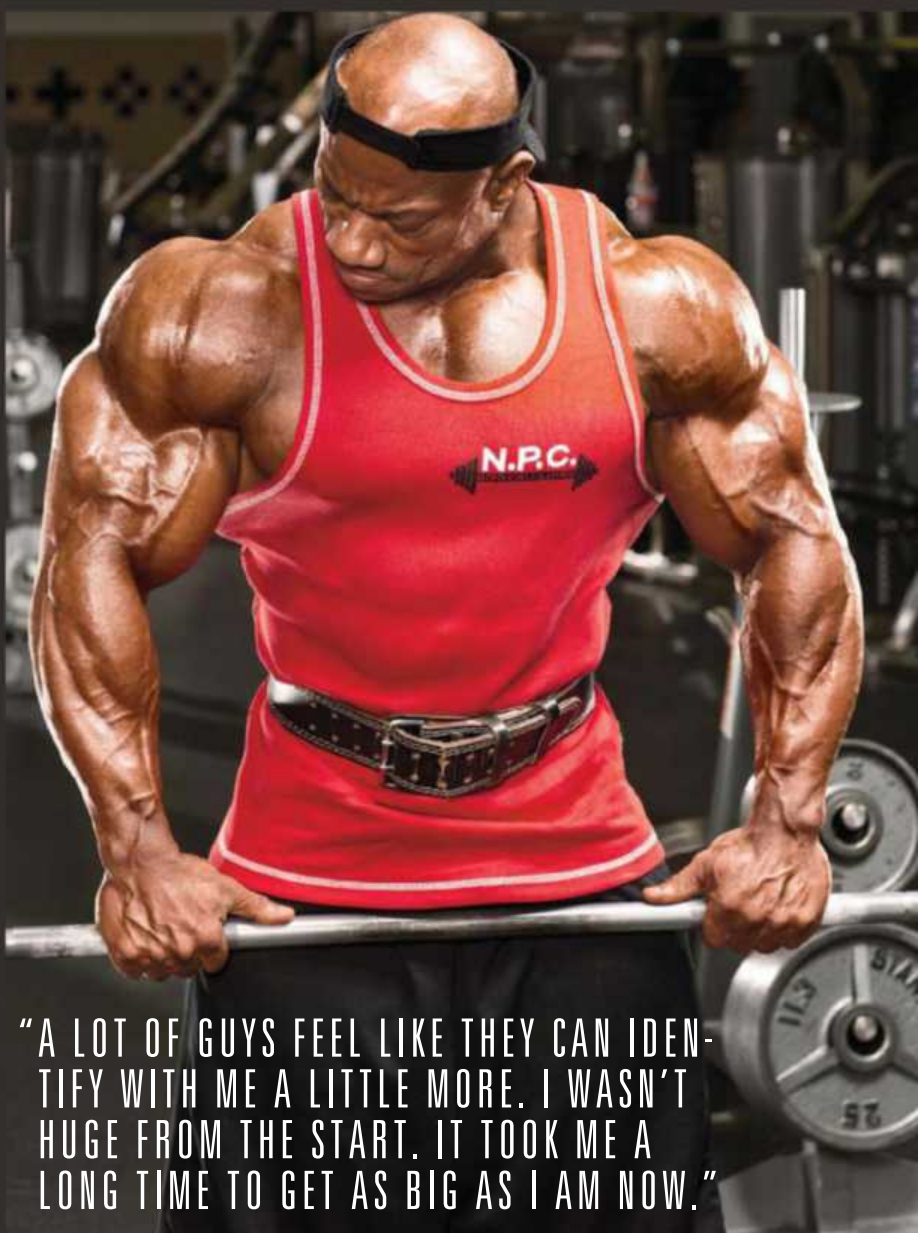
I think I recall you telling me that there have been some other standout athletes in your family too.

I have two sisters and three brothers. My sister Gayle set records as one of the best female high school basketball players in Florida. She averaged 37 points a game, and

now she is the first woman in Florida to coach a boy's high school basketball team. My older sister Nancy was excellent in track and softball, and all three of my brothers were standouts in football, basketball and track. I am the only one who became a professional athlete, but my whole family are sports fanatics. If you go to my parents' house, ESPN is usually on the TV.

Getting back to how far you've come, we talked about your physique. But let's talk about a real case of "started from the bottom, now we're here." People see you with the luxury cars and the expensive watches now, but you were really struggling in your final years as an amateur. Give the readers an idea of just how rough things were for you and your family back in the mid- to late '90s.

I had my son and my daughter, plus my girlfriend's two sons that I was raising with her. The six of us were living in a two-bedroom apartment with no furniture. We slept on the floor. She was working two or three jobs to pay the bills and so that I could focus on trying to turn pro. Our game plan was for me to turn pro and then I would start making good money for us. But in the meantime, it was rough and there was no extra money at all. Going into the 1998 North Americans, I had a pretty good job I had been at for a few months. But I said, if I win, I'm not coming back there. I won the show, and never did



"A LOT OF GUYS FEEL LIKE THEY CAN IDENTIFY WITH ME A LITTLE MORE. I WASN'T HUGE FROM THE START. IT TOOK ME A LONG TIME TO GET AS BIG AS I AM NOW."

"IT MAKES ME FEEL GOOD TO KNOW I AM BEATING ALL THESE YOUNGER DUDES! TRAINING SMARTER HAS ALLOWED ME TO STAY ON TOP FOR A LOT LONGER THAN I EVER THOUGHT I WOULD."



go back. I had this idea that as soon as you turned pro, the money just started pouring in. Lo and behold, that was not the case! You have to prove yourself first.

How did you get your first contract and start making money after you turned pro?

Right after I won, my attorney and I sent out packages to a few supplement companies with my photos and résumé. MuscleTech showed immediate interest. I started getting ready for the 1999 Iron Man Pro while I sent off a letter trying to get invited to the Arnold Classic. They did invite me, at which point I decided to skip the Iron Man even though it was just a week before, and most of the guys used it as a warm-up. Looking back, I feel it was a mistake. If I had done the Iron Man, the judges would have known who I was the next weekend in Columbus. I still got seventh place at the Arnold, which was my first pro show. But I feel like if I had done the Iron Man first, I would have been in the top five.

A couple of months later, I did the Night of Champions and took third place behind Paul Dillett and Pavol Jablonicky. MuscleTech contacted me right after that, and I ended up being with them for over 10 years. Soon we had a TV and furniture and some nice things at home, finally. The best part was walking past my daughter's room and hearing her talking to one of my girlfriend's sons about how we had gone "from rags to riches." For some reason that just stuck in my head and I always cherish that memory. My girlfriend's friends didn't have much to say, though. They had been telling her to leave me for the last of couple years and now they saw I wasn't such a bum after all.

Speaking of family, you have two children. Ronnie is over 50 and might have 10 kids before he's all done. How about you? Any chance you might become a father again, or are you definitely all done?

First off, I have two kids, but I raised three. I've been with Gale for 11 years, since her daughter Celine was 5. Also, I am pretty sure Ronnie has more than 10 kids now. As for me, I'm good. I'm a grandfather now, and I am all done having kids.

Speaking of Gale, how much of a part has she played in your career and in making your life better in all ways?

I don't even know where to start. She's an amazing woman and she has supported my career so much. What other woman would encourage her man to take off for months at a time across the country just to train for a contest, because she understood what a difference Charles Glass makes for me? Leave me and my daughter behind? Very few. Gale does a lot of the work with my Team Blade contest-prep business and with my contest promotions—let's say most of the work! She's also a busy soccer mom with Celine, who is now a junior in high school. I am blessed to have found a woman like Gale.

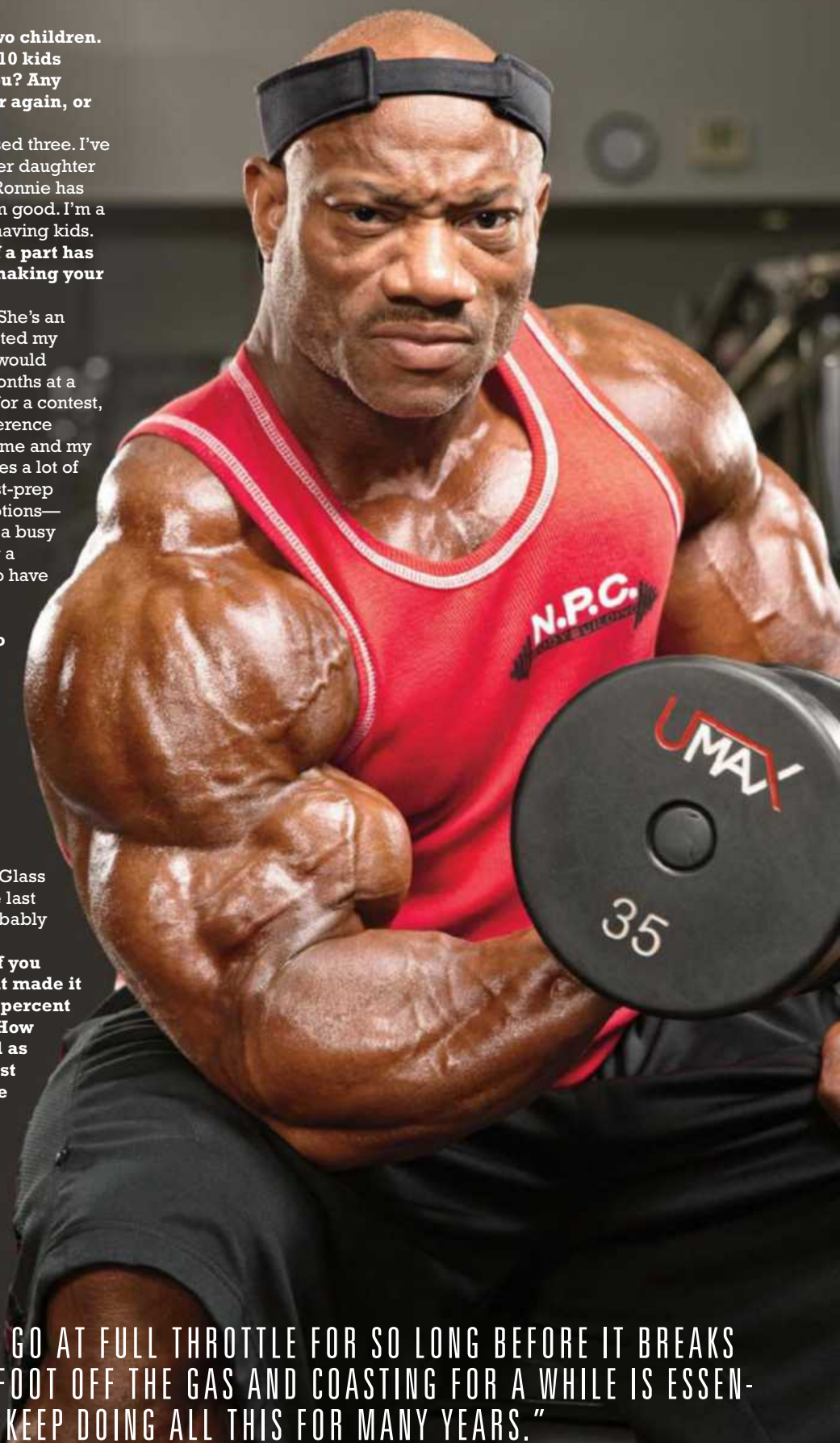
You spend a good half the year away from your home in Florida to train with Charles Glass at Gold's in Venice. How hard is it for you to be apart from your family and friends for so long? How hard is it for them?

It's very hard being away from Gale and my mom. I am a momma's boy, and not ashamed to say it! But they understand that this is my job, and I have to do what I need to do. I can't even tell you the role Charles Glass as a trainer has played for me these last few years. If it weren't for him, I probably would have retired.

You told Peter McGough that if you ever suffered a serious injury that made it impossible for you to ever be 100 percent onstage again, you would retire. How are you able to train as heavy and as intensely as you do without at least coming close to injury every once in a while?

It's because I have learned to make adjustments, and Charles has helped a lot with that. In my younger years, my training was based around all the heavy compound movements with barbells: squats, bench presses, deadlifts, military presses and rows.

"YOUR BODY CAN ONLY GO AT FULL THROTTLE FOR SO LONG BEFORE IT BREAKS DOWN. TAKING YOUR FOOT OFF THE GAS AND COASTING FOR A WHILE IS ESSENTIAL IF YOU WANT TO KEEP DOING ALL THIS FOR MANY YEARS."



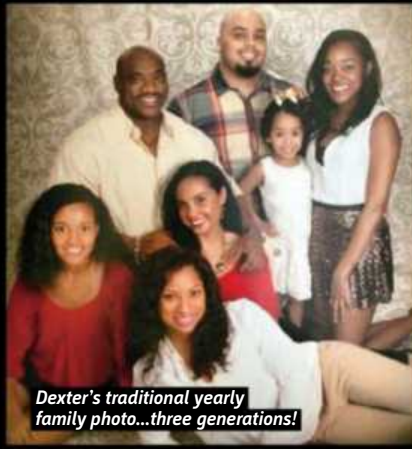
A Little Family Time with DEXTER "THE BLADE" JACKSON



Dexter and his beautiful wife Gale before prejudging at the Olympia last year.



Parent Weekend at the Air Force Academy. Celine, 16, and Myah, 21.



Dexter's traditional yearly family photo...three generations!



Dexter and his siblings at his parents' 45th wedding anniversary party.



Dexter and Gale with daughters on the family vacation cruise to the Bahamas.



Dexter's son, "Lil" Dexter in action playing Arena League Football



Dexter and his son post game



Dexter and Gale's 4-year-old granddaughter Sariya.



With the legends at Mr. Weider's 91st birthday dinner party.



Dexter with two popular actors from "The Young and the Restless" soap opera. He records it daily and watches every night. He's been a huge fan since high school.

They worked very well for me and they did allow me to gain most of the mass I have today. But they started taking a toll on my joints. If I had insisted on doing all those, I am sure I would have gotten hurt badly by now. But I have switched to a lot more machines and dumbbells, and don't do any of those movements I mentioned. I can still go heavy and train with intensity using machines, and that's kept me safe.

Another thing that I've mentioned before is that if I ever feel a tweak like I might be about to injure something, I won't train that body part at all until everything feels 100 percent. I don't care if that takes a month or two. Forget all that mess about "no pain, no gain." I have seen so many guys get hurt and they're never the same again. I know that muscle has memory. If I don't train an area for a while, anything I lose will come right back. Finally, I have to say I've been blessed. Some injuries really do happen because of bad luck. I've been lucky.

People love to talk about your age, because it is so unusual for a pro bodybuilder to still be in his prime at 45 or 46. But be honest, do you even think about it in those terms, and are you getting sick of hearing how old you are all the time?

No, it's all good because it makes me feel good to know I am beating all these younger dudes! And I never think of my age as being a bad thing because I am still in my prime. Most guys in their 40s lose overall fullness or start losing their legs. Not me. Training smarter has allowed me to stay on top for a lot longer than I ever thought I would.

Your career has already been so long and distinguished, that anything from this point on really is just icing on the cake. Are you starting to put a time limit on how much longer you'll keep doing this, or are you going to ride it out as long as you're staying on top?

Like I said earlier, the fire is still burning. One reason is that even though I am competing against all those other guys, I am always competing against myself. I will look at pictures after every contest and ask, how can I be better than this? I am never completely satisfied with my physique. I always

see something I can improve. When that fire goes, I will be done.

Another thing that I use as a gauge is how I place. As long as I am still placing in the top five at the Mr. Olympia, I know I still belong onstage. Once I slip and start losing to guys who have no business beating me, I will know for sure it's time to say goodbye.

Last question. You've been around competing since the '90s, which many feel was the end of the "Golden Era" for the sport of bodybuilding. The Internet changed everything, and now we also have so many other divisions competing for publicity, endorsements, fan support and participants. Are you glad you got into the sport when you did rather than starting out in 2015?

I am so glad. There were so many more opportunities for bodybuilders back then. There were a lot more shows held in Europe we could travel to. Like you said, there are so many other divisions now and bodybuilding doesn't have the same status it did in the '90s. I am fortunate to have been part of the sport in very different eras, and I am very happy I got into it when there was still some of that magic left. But I also feel blessed to still be here and part of the sport after all these years. I still love it.

DEXTER'S PRO WINS

2002	British Grand Prix
2003	Show of Strength Championships
2004	Iron Man Pro
2004	San Francisco Pro
2004	Australian Pro
2005	Arnold Classic
2006	Arnold Classic
2007	Australian Pro
2008	Arnold Classic
2008	Australian Pro
2008	New Zealand Pro
2008	Romanian Pro
2008	Mr. Olympia
2011	FIBO Power, Germany
2011	Masters Pro World
2012	Masters Mr. Olympia
2013	Arnold Classic
2013	Australian Pro
2013	Tijuana Pro
2014	Dubai Open
2015	Arnold Classic
2015	Arnold Classic Australia
2015	Arnold Classic Europe
2015	Prague Pro

"I CAN'T EVEN TELL YOU THE ROLE CHARLES GLASS AS A TRAINER HAS PLAYED FOR ME THESE LAST FEW YEARS. IF IT WEREN'T FOR HIM, I PROBABLY WOULD HAVE RETIRED."

Dexter Jackson is an Ultimate Nutrition athlete. For more information on Ultimate Nutrition products, please visit www.ultimatenutrition.com.



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MD'S ULTIMATE 20 PROGRAM



BY RON HARRIS
PHOTOGRAPHY BY PER BERNAL
AND GREGORY JAMES

16 MASS

YOUR COMPLETE TRAINING AND DIET GUIDE!

2016: 365 DAYS TO GET HUGE!

Let's be real. No Bull. Making significant gains in lean muscle tissue is not a fast process, unless you are a raw beginner and all this is brand new to you. For the rest of us who have already been training for a period of years (or even decades for us older dudes), programs making outrageous promises along the lines of gaining 20 pounds of muscle in six weeks are beyond ridiculous. Even if you happen to be including a wide variety of muscle-enhancing pharmaceuticals in your program, you're not going to put on muscle at that rate. You can certainly gain 20 pounds in six weeks if most of it is in the form of fat and water, but solid muscle that will still be there when the time comes that you decide to get lean? Nope. But a year, now that's a significant amount of time. You can accomplish a lot and make very noticeable

changes to your physique in a year, especially if you are motivated, focused, have a clear plan and stick to it. That's what the Ultimate 2016 Mass Program is all about. We have a finite amount of time to work with, yet it's ample time to bring about improvements in the size of your muscles. But we must also bear in mind that a year is much too long to follow the same exact training program and diet and expect results to be consistent for that duration. If variables such as the exercises used, rep ranges, amount and intensity of cardio, caloric intake and macronutrient ratios, etc. remain constant, progress will stall, you will hit a plateau and you will stay stuck there. We don't want to be stuck. We want to keep moving forward. So instead of following one workout and diet routine for a year, we will divide 2016 into three distinct phases, as follows.

MD's Ultimate 2016 Mass Program



PHASE 1: JANUARY 1-APRIL 30

Goals: Mass and Strength

Many bodybuilders have found that focusing on strength gains has carried over into mass gains. For this phase, you won't exclusively focus on getting stronger, but you will be working in rep ranges geared more toward raw power for parts of your workouts, as well as using more basic compound movements and fewer isolation exercises. Your cardio will be quite moderate in frequency, duration and intensity, just enough to maintain good cardiovascular fitness. It will not be done for purposes of fat loss.

PHASE 2: MAY 1-AUGUST 31

Goals: Build Quality Mass and Drop fat

These four months are devoted to what many currently refer to as a "mini cut." Wait, what? Why the eff would you want to worry about losing fat in the middle of a year, where the goal was to get as huge as possible? It's really not about losing fat. It's about setting you up to continue making more gains. The human body is a remarkably adaptive organism. You've probably noticed that the longer you diet, the harder it gets to lose weight/body fat. That's because

your body is adjusting to the lowered caloric intake and higher activity level in an effort to maintain homeostasis. A similar phenomenon occurs when you have been slamming an excess of calories and doing your best to gain muscle mass. After a few months, the muscle gains will grind to a halt and any additional pounds will be pure fat. Those who have dieted down for competitions know that typically, you tend to make brand new gains in the eight to 12 weeks after a contest. After being deprived of higher calories and an "anabolic environment" for a period of months, your body is primed to grow. So by reducing your carbs and calories a bit and bumping up your cardio, you will "reset" your system so it's ready and willing to finish off the year with a blitz of new muscle growth. And in the meantime, you'll be looking leaner and meaner for the hot months of the year when you can show off the gains you've made from January through April! As for your training, you will be using higher volume to burn more overall calories, as well as incorporating more isolation exercises and putting less emphasis on the basics. Reps will be a bit higher, as

strength gains are not a goal during this phase. You will maintain your strength and gain just a bit of muscle. Cardio will be more frequent, longer in duration and higher in intensity.

PHASE 3: SEPTEMBER 1-DECEMBER 31

Goal: Purely in Quest of Mass!

These final four months will be your final push and your last chance to grow, before the deadline comes and 2016 ends. You will be training with a mix of compound and isolation movements, a wide mix of rep ranges and various intensity techniques. Since it's the "home stretch," this is when you want to dig deep and put forth every last ounce of effort. Leave nothing behind on the gym floor at every workout. Calories and carbs will be increased again, and cardio will revert back to being done in moderation to facilitate recovery and growth.

Prep Work

This issue should be in your hands just before the start of December 2015 or perhaps a little later. That's a good thing, because I want you to ease up just a bit on your training until Friday, January 1—New Year's Day 2016. You are going to be working very hard and pushing past your previous limits for the entirety of 2016. It will be challenging and demanding. That's why I want you to be fully rested up and recovered when you begin your 12-month assault for mass. Until starting day, I want you to cut back to about two-thirds of your normal training volume on every body part. Perform only straight sets. Do no drop sets, supersets or giant sets. Furthermore, don't even take your sets to complete failure. Stop about a rep or two short. Do not attempt to set new personal bests in weight on any exercise. Don't worry—you're not going to lose any muscle. If you are overtrained, which many of you unknowingly may be, you might even gain a little bit before we officially set forth on the 2016 mass program. On New Year's Day, your journey begins!

TRAINING - PHASE 1

Notes: This is very much a "back to basics" routine. It's comprised almost entirely of free-weight classics, with training days grouped into pushing muscles of the upper body, pulling muscles and legs. The split builds a rest day between the pull day and legs, due to the fact that both deadlifts and squats take a toll on the lower back. Doing those two exercises on consecutive days would

GREGORY JAMES

not be wise. As for exercise substitutions, they should not be made unless a current or previous injury calls for it. In such a case, do your best to still use free weights before looking to a machine to replace the movement. For example, if you can't do flat barbell presses, opt for dumbbells if possible, or do front squats instead of back squats. The aim here is to gradually get stronger over the course of these four months on the absolute most productive mass-building movements. That being said, do not sacrifice good form. Loosening up form to move more weight typically takes stress off the target muscles and increases your chances of injury. Warm-ups are not shown, but do as many as you need to. Pyramiding up in weight is a further method included to ensure that your muscles are fully ready for the final, heaviest sets. This is why the reps listed start off higher, and decrease as the sets go on. Finally, you may slide in extra "off" days if you feel run-down and overtrained at any point. The split is designed so that extra "off" days won't interfere.

YOU CAN ACCOMPLISH A LOT AND MAKE VERY NOTICEABLE CHANGES TO YOUR PHYSIQUE IN A YEAR, ESPECIALLY IF YOU ARE MOTIVATED, FOCUSED, HAVE A CLEAR PLAN AND STICK TO IT.



PHASE 1 TRAINING SPLIT

Day 1: Push – Chest, shoulders and triceps
 Day 2: Pull – Back and biceps
 OFF
 Day 3: Legs
 OFF or Repeat

DAY 1: PUSH – CHEST, SHOULDERS AND TRICEPS

Flat Barbell Bench Press	4 x 12, 10, 8, 6
Incline Barbell Press	4 x 12, 10, 8, 6
Dumbbell Lateral Raises	3 x 10-12
Seated Barbell Military Press	4 x 12, 10, 8, 6
Dips (weighted if possible)	3 x 8-10
Lying EZ-bar Extensions	3 x 8-10

DAY 2: PULL – BACK AND BICEPS

Chin-ups	5 x 10-12*
Barbell Rows	5 x 12, 10, 10, 8, 8
Deadlifts	5 x 12, 10, 8, 8, 6
Barbell Curls	4 x 8-10
Hammer Dumbbell Curls	3 x 8-10

*Add weight if this rep range is too easy.

DAY 3: LEGS

Treadmill or Bike	5-8 minutes
Leg Extensions	3 x 15-20
Squats	5 x 15, 12, 10, 8, 6
Leg Press	4 x 10-12
Lying Leg Curls	4 x 10-12
Romanian Deadlifts	4 x 10-12
Standing Calf Raises	4 x 20, 15, 12, 10

Cardio: Three sessions a week of 20-30 minutes should suffice. Preferably, these should be done post-workout, before you drink your



QUALITY FOOD LEADS TO QUALITY GAINS, AND GARBAGE FOOD WILL ONLY MAKE YOU GAIN FAT.

post-workout shake. Use any machine you like. Work hard enough to get your heart rate and breathing up and break a light sweat, no more and no less. Cardio during this phase should neither be super easy nor especially challenging.

DIET – PHASES 1 AND 3

Meal 1: 3 whole eggs, 4 egg whites, 1 cup oatmeal (dry measure), 1/2 cup fruit of choice mixed into oatmeal. You may add sausage or ham to the eggs.

Meal 2: Large chicken breast or thigh, 2 cups white rice. You may add sauce of your choice to the rice for flavor.

Pre-workout: Pre-workout formula containing caffeine (400mgs), tyrosine (2 grams), citrulline malate (6 grams), creatine monohydrate (5 grams), betaine (2-5 grams).

Post-workout: Shake with 50-60 grams whey protein, L-leucine (5 grams), creatine monohydrate (5 grams), betaine (2-5 grams).

Meal 3: Chicken or turkey breast, large sweet potato.

Meal 4: Protein shake with 2 pieces fruit.

Meal 5: 10-12 oz. salmon or ground beef, 2 cups white rice or potato.

Meal 6: 10-12 oz. steak or ground beef, 1 cup mixed nuts.

Meal 7: Protein shake, mid-sleep cycle.

Notes on Your Nutrition

The diets listed here are merely a guideline, and you may substitute foods accordingly as long as the general framework remains the same. Meals should be spaced two to three hours apart, and all should contain a quality protein source. There is a world of difference between a chicken breast you buy from the market and grill yourself and a 10-piece box of Chicken McNuggets, for example. Even though this is an off-season diet aimed at putting on weight, that weight should be mostly in the form of quality muscle. Cheat meals and treats are acceptable a few times a week, but quality food leads to quality gains, and garbage food will only make you gain fat.

You should be getting 1.5 grams of protein per pound of bodyweight. As for carbohydrates, start with two grams per pound and adjust from there based on your results. If you aren't gaining at all, increase by 50 grams a day for a week and check again. Keep adding until you do see bigger numbers on the scale. If you are putting on more fat than muscle, decrease by 50 grams. Soon you will find the right amount where you are gaining primarily muscle along with a bit of fat. Don't skimp on healthy fats like lean red

meat, whole eggs, salmon, nuts and nut butter. Try to get about 75-100 grams a day. You will need to keep a food log to do all of this right. There are many good websites that list the calories and macronutrient breakdowns of various foods. One excellent one I've seen is www.calorieking.com. It is a lot of work to write down all your meals and work out the calories and macros, but it's the only way you can truly be in control of your nutrition.

Even if you do decide to cut back on your carbohydrate intake, do keep a substantial amount of carbs in your pre-workout meal and post-workout meal. Your last meal of the day should have fats in it, so it takes longer to digest while you sleep. Staying anabolic and avoiding catabolism, or the breakdown of muscle tissue for its amino acids by the body, is key in making gains. Finally, that's also why a protein shake at some point in the middle of the night is particularly valuable. Have it premixed in your refrigerator, and drink it whenever you get up to use the bathroom at some point between going to sleep at night and getting up in the morning. Just this one small change has helped many guys I have known break past a plateau.

TRAINING - PHASE 2

Notes: Now we are heading into a more traditional or standard type of bodybuilding routine. There are more cables and machines included in this phase, mainly to switch things up but also to provide your joints some relief from the constant pounding they were under over the course of Phase 1 and all the heavy compound lifts. Also with that in mind, the reps are never under 10 at any time in Phase 2. If you can't get 10 reps, you're using a little too much weight. Don't be tempted to add in more compound lifts or train heavier. All that is coming up soon enough.



GREGORY JAMES; TOP RIGHT: PER BERNAL

YOU'LL BE LOOKING LEANER AND MEANER FOR THE HOT MONTHS OF THE YEAR WHEN YOU CAN SHOW OFF THE GAINS YOU'VE MADE FROM JANUARY THROUGH APRIL.

PHASE 2 TRAINING SPLIT

- Day 1: Chest and triceps
- Day 2: Back
- Day 3: OFF
- Day 4: Shoulders and biceps
- Day 5: Legs
- Day 6: OFF or Repeat

DAY 1: CHEST AND TRICEPS

- Incline Dumbbell Press 4 x 10-12
- Flat or Vertical Machine Press 4 x 10-12
- Pec Flyes or Cable Crossovers 4 x 12
- Cable Pushdowns 4 x 10-15
- Overhead Dumbbell Extensions 4 x 12
- Machine Dips 4 x 12

DAY 2: BACK

- Lat Pulldowns 5 x 12
- Dumbbell Rows 4 x 12
- Cable or Machine Rows 4 x 12
- Cable or Machine Pullovers 4 x 12
- Dumbbell or Machine Shrugs 4 x 12

DAY 4: SHOULDERS AND BICEPS

- Seated Dumbbell Press 5 x 10-12
- Machine or Cable Lateral Raises 4 x 12
- Bent Dumbbell Laterals 4 x 12
- Wide-grip Upright Rows 4 x 12
- Preacher Curls 3 x 10-12
- Reverse Barbell Curls 3 x 10-12
- Machine or Cable Curls 3 x 12

DAY 5: LEGS

- Treadmill or Bike 5-8 minutes
- Lying Leg Curls 5 x 10-15
- Leg Extensions 4 x 12-20
- Front Squats or Hack Squats 5 x 10-15
- Leg Press 4 x 12-15
- Romanian Deadlifts 4 x 12
- Walking Lunges 3 rounds, 15 steps per leg
- Calf Raises on Leg Press 4 x 10-15
- Seated Calf Raises 3 x 10-15

Cardio: Five to six sessions a week of 30-40 minutes. It is recommended that

you do longer sessions on your days off from weight training, shorter ones after weights. You may choose to not do cardio the day after leg workouts to allow for better recovery. If you do cardio on that day, be sure the intensity is not extreme. As for the other days, work hard and get a real sweat going.

DIET – PHASE 2

Meal 1: 6 egg whites, 1 cup oatmeal (dry measure), 1/2 cup fruit of choice mixed into oatmeal.

Meal 2: Large chicken breast, 1.5 cups white rice. You may add sauce of your choice to the rice for flavor two to three times per week, preferably on days you weight train.

Pre-workout: Pre-workout formula containing stimulant, pump-enhancing

items and creatine.

Pre-workout: Pre-workout formula containing caffeine (400mgs), tyrosine (2 grams), citrulline malate (6 grams), creatine monohydrate (5 grams), betaine (2-5 grams).

Post-workout: Shake with 50-60 grams whey protein, L-leucine (5 grams), creatine monohydrate (5 grams), betaine (2-5 grams).

Meal 3: Chicken or turkey breast, large sweet or white potato.

Meal 4: Protein shake with 1 piece of fruit.

Meal 5: 10-12 oz. salmon or lean ground beef, 1 cup white rice.

Meal 6: 10-12 oz. steak or 4 whole eggs, 1 cup mixed nuts, green salad.

Meal 7: Protein shake, mid-sleep cycle.

TRAINING – PHASE 3

Notes: We have saved the best – and toughest – phase for last.

PHASE 3 TRAINING SPLIT

Day 1: Chest and biceps
Day 2: Legs
Day 3: OFF
Day 4: Shoulders and triceps
Day 5: Back
Day 6: OFF

DAY 1: CHEST AND BICEPS

Incline Barbell Press	4 x 12, 10, 8, 8
Flat Dumbbell Press	4 x 12, 10, 8, 8
Pec Flies	4 x 10-12
<i>superset with</i>	
Push-ups to failure	
Alternate Dumbbell Curls	3 x 10-12
EZ-bar "21s"	3 x 21
Cable Reverse Curls	3 x 10-12
<i>superset with</i>	
Cable Curls	3 x 10-12

DAY 2: LEGS

Treadmill or Bike	5-8 minutes
Leg Extensions	3 x 12-15
Squats	5 x 20, 15, 12, 10, 8
Seated Leg Curls	4 x 10-12
Leg Extensions	4 drop sets of 10, 10 and 10 reps for total of 30 reps each
<i>superset with</i>	
Leg Press	4 x 10-15
Lying Leg Curls	3 x 10-12
Standing Calf Raises	4 x 12-15
Seated Calf Raises	4 x 10-12

DAY 4: SHOULDERS AND TRICEPS*

Seated Dumbbell or Barbell Press	4 x 12, 10, 8, 8
Dumbbell Lateral Raises	5 x 10-12+
Wide-grip Barbell Rows	4 x 10-12
Overhead Machine Press	5 x 10-12+
Rope Pushdowns (no spread)	3 x 12
Dips or Close-grip Bench Press	4 x 10-12
Underhand Cable Pushdown (Use a short straight bar attachment)	3 x 10-12
<i>superset with</i>	
Overhand Cable Pushdown	3 x 10-12

*Rear delts are done with back on this split, so as not to interfere with their assistance on pulling movements, as they would if done the day prior to back.

+These are done "FST-7" style, with only 30 seconds rest between sets, though we do 5 sets rather than 7.

PER BERNAL



IT DOESN'T MATTER HOW HARD YOU TRAIN OR HOW PERFECT YOUR WORKOUTS ARE PLOTTED OUT. IF YOU DON'T RECOVER FROM THE WORKOUTS, NO MUSCLE GROWTH WILL OCCUR.

DAY 5: BACK

Chins	3 wide-grip x 10-12 3 neutral grip x 10-12
Deadlifts	4 x 12, 10, 8, 6
T-bar or Barbell Rows	4 x 10-12
Narrow-grip Pulldowns	3 x 10-12
Machine or Cable Pullovers	5 x 10-12*
Seated Cable Rows	3 drop sets of 8, 8 and 8 reps, for 24 total reps
Machine Rear Laterals	3 x 12
<i>superset with</i>	
High Rope Pulls	3 x 12
*Rest only 30 seconds between sets.	

Cardio: Same as Phase 1, just enough for general health and circulation benefits. Do three sessions a week of 20-30 minutes, nothing too tough.

WHAT ABOUT ABS?

You may have noticed that no direct abdominal work is listed. I personally believe that the abs receive a substantial amount of indirect work stabilizing your body during most exercises. If you feel you want or need to train your abs, by all means do so. Three or four sets each of crunches and hanging leg raises twice a week should be plenty.



STIMULATE THE MUSCLE WITH HARD WORK, FEED IT AND REST IT. THAT'S THE SIMPLE FORMULA FOR GAINS.

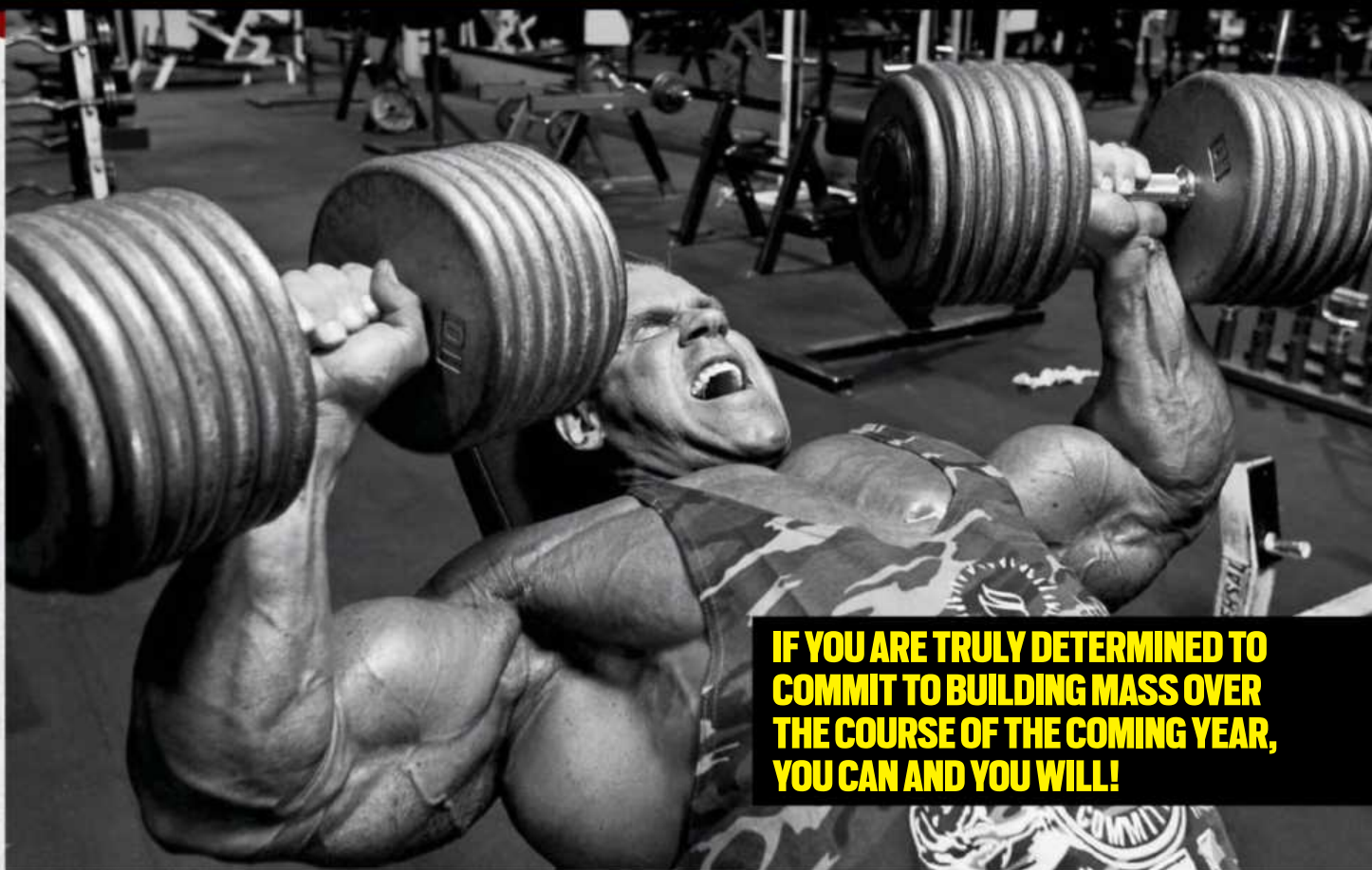


Rest and Recovery

I've said it a thousand times or more, and I will keep this saying because it always bears repeating. It doesn't matter how hard you train or how perfect your workouts are plotted out. If you don't recover from the workouts, no muscle growth will occur. After nutrition, not respecting the need for proper recovery is where most guys go wrong in their pursuit of greater size. First up, you need to sleep a solid eight hours a night. If that means you can't watch as much TV or have to cut back on your hours online, so be it. Take naps if you can, too, unless you've found naps make it tougher to get to sleep at night. Limit your outside physical activities.

All three training phases have rest days built into the splits. Resist the temptation to skip rest days and keep training continuously. The workouts have been designed to avoid overlap between body parts on consecutive days, and again—you must fully recover to grow.

I would be remiss if I didn't mention steroids, since some of you out there do use them. Steroids greatly enhance recovery, but I still stress the need for those rest days that are built in. For those of you training naturally, and especially if you're 35 or older or work a demanding job, you might even choose to take two rest days between workouts if you're starting to feel run-down. I would



IF YOU ARE TRULY DETERMINED TO COMMIT TO BUILDING MASS OVER THE COURSE OF THE COMING YEAR, YOU CAN AND YOU WILL!



strongly suggest that everyone take four to five full days off between Phase 1 and 2, and again between Phase 2 and 3. Stimulate the muscle with hard work, feed it and rest it. That's the simple formula for gains!

Measuring Progress

The scale is the most obvious tool to measure gains, but the inherent flaw with using only bodyweight as your gauge is that it says nothing about your actual body composition. Gaining 20 pounds in 2016 is nothing to celebrate if it's 20 pounds of fat! You can use the mirror or photos as well, but the flaw with visual evaluation is that many of us have a hard time seeing ourselves as we truly are. You could be getting fatter and remain convinced you are only getting bigger and fuller. For all these reasons, I urge you to use some form of body fat testing at these four key points in the year:

- January 1
- April 30
- August 31
- December 31

Skinfold calipers are the cheapest and most accessible method to test your body fat, but they tend to only be accurate when the testing is done by a skilled person who has done it many times. If possible, seek out hydrostatic weighing, bioelectrical impedance, a DEXA scan or air-displacement plethysmography (Bod Pod). Having an accurate reading of your body composition will let you know exactly how many pounds of lean muscle and how many pounds of body fat you are carrying. Theoretically, you could lose a large amount of body fat while at the same time gaining significant muscle mass, and your bodyweight wouldn't change tremendously. Reliable testing will tell you how much lean muscle mass you have at each point along your quest for mass in 2016, with the initial and final results, of course, being the most important. The bottom line is that if you are truly determined to commit to building mass over the course of the coming year, you can and you will! ■

PER BERNAL

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Jose Raymond's TOP 10 ARM EXERCISES

BUILDING MASSIVE BI'S AND TRI'S WITH THE BOSTON MASS

BY RON HARRIS
PHOTOGRAPHY BY MICHAEL NEVEUX

LIFE BEGINS AT 40 FOR THIS GUY

Just two days before 2014 came to an end, Jose Raymond celebrated his 40th birthday with a surprise party attended by about 30 of his closest friends. Normally, such a milestone would not be a happy day for a professional athlete. The human body can only be at its physical prime for so long, and in sports like football, baseball, basketball, MMA or soccer, it's rare to see a man still at the top of his game heading into his fourth decade of life. Bodybuilding is a little different in that aspect. Our cover man Dexter Jackson is certainly proof of that, and so is Jose. 2015 was actually his most distinguished competitive year ever!

2015 – JOSE ADVANCES TO THE NEXT LEVEL

The season kicked off with the Arnold Classic. Flex Lewis had won the premiere edition of its 212 event in 2014, but he decided to pass on it this year. "I'm always confident in my abilities," Jose said, "and at my best I know I am in the running to win any 212 show. But once I heard Flex wasn't doing it, I knew it was wide open for me to win."

In fact, Jose trained and prepared for the Arnold Classic

with 100 percent certainty he would win. "My training and the whole prep was laser-focused," he tells us. Part of the winning strategy as devised by his coach, Chris Aceto, was to take a longer and more gradual approach to the prep. "We actually started on December 1st," Jose explains. "It usually takes me a few weeks to get the ball rolling with my prep anyway, so this allowed me to enjoy Christmas and my birthday without missing a beat."

Much of Jose's confidence came not only from knowing The Welsh Dragon wouldn't be in the Arnold, but also in knowing he genuinely is better than ever. "I'm rounder and fuller, denser and more detailed," he states. "My hips are what they are, and my clavicle width hasn't changed, but I've grown my delts and brought a new fullness to my legs, and together that creates more of an X-frame." That fullness came from using the treadmill and the stationary bike for his cardio in lieu of the StepMill, which he only recently figured out had been flattening out his wheels.

Jose did in fact go on to win the Arnold Classic and get that onstage interview with Mr. Schwarzenegger that every pro dreams of.



YET ANOTHER MILESTONE FOR THE BOSTON MASS

As if winning the Arnold, moving up to second place at the Olympia and placing second in his open class debut weren't enough, this year featured yet another and perhaps far more significant turning point—the man I was certain would be a lifelong bachelor got engaged! The woman to tame this wild beast is the lovely Michela Marquardo, his girlfriend since December 2013. After dating so many seemingly eligible women over the years, how did Jose know Michela was The One? “It just works,” he explains. “She’s calmed me down and made me a more relaxed person. Michela is so supportive. We train together, she helps with my meals, and we have a simple, relaxing life together.”

Jose even credits this relationship with making him a better bodybuilder these last two contest seasons. “I have no outside distractions anymore, and I’m truly content for the first time with who I am and what I want from life. It was time to finally settle down with someone I could be a partner with for the rest of my life.”

After a brief respite from dieting and training for a few weeks, Jose began training for the 212 Showdown at the Mr. Olympia with a newfound zeal and self-assurance. “I had already beaten every top contender going into that show except Kevin English, because I have beaten Flex himself in the past. And he was gonna have his hands full this time with me.”

In Las Vegas, his battle with reigning three-time champion turned out to be closer and more epic than even Phil versus Dexter. After taking sixth place at the Olympia the first year, fourth place on three occasions and twice landing in the third slot, Jose moved up to the runner-up position. Shortly after, he scored the 10th win of his pro career at the EVL Prague Pro Championships. But he wasn't finished for the year quite yet.

“I’d always wanted to enter an open pro show, but more so over the last year,” Jose reveals. “People had been speculating how I would do online, and I was curious myself. The more I thought about it, the more I realized that your height and weight shouldn’t be an issue in bodybuilding. Mohamed Makkawy beat Lee Haney early in Lee’s career, and Momo Benaziza beat Dorian. Guys like Danny Padilla, Franco Columbu and Lee Labrada routinely beat taller, heavier men—and I’m bigger than all of them!”

Jose targeted the Phoenix Pro, where he won the 212 division last year. Out of 12 men, Jose almost won, placing second and beating men like the 2014 winner, Moe Bannout, and the highly favored Steve Kuclo, in the process.



YES, HIS ARMS HAVE ALWAYS BEEN DAMN GOOD

When you read a training article about a pro with an outstanding body part, odds are that it's a muscle group that responded well for them from day one. Branch's legs grew like crazy, as did Wolf's delts, Johnnie Jackson's traps and so on. While it's often a bit more informative and useful to learn how a pro brought up a lagging body part, the reality is that rarely does that particular body part ever become truly impressive. So to stoke your motivation, and especially since we men are visual creatures, we do photo shoots and training articles based on the best body parts of the pros. With that out of the way, I can tell you that Jose Raymond started showing signs of a gift for building biceps and triceps muscles as early as 5 years old. Yes, 5.

"My favorite TV show was 'The Incredible Hulk,'" he recounts. "I used to run around doing the front double biceps pose and growling all the time. Most of the pictures of me taken when I was a kid, I was flexing my arms. My arms, forearms and hands were all disproportionately big when I was little." And his arms would continue to be exceptional. "By the time I was 10, I had arms the size of 15-year-old kids who trained," he says. "By 15, they were the size of college-age kids who lifted. And by the time I was 20, they were bigger than anyone's I knew except for a few high-level bodybuilders in the Boston area."

When Jose started competing as a teen in 1993, all he really had was good arms and legs. His chest, back and shoulders all trailed behind his limbs in development. By the time he started competing as a pro in 2009, he had grown substantially, of course. Yet the disparity remained, to an extent. "I looked around at the other pros in the 202 division, which was still new at the time," he tells us. "I saw that very few of them had me beat on arms and legs, but a good amount of them had better chests, backs or shoulders. So those were the areas I focused on and worked hardest to improve."

Clearly, he succeeded in that goal. You don't win 10 pro shows including the Arnold Classic, second in total wins only to Flex Lewis, and achieve the rank of second-best 212-pound bodybuilder in the world, without balanced and even development. But now that he has achieved all that, Jose is back to working his 21-inch arms hard again, with the aim to make them even freakier. Here are his 10 favorite exercises to blow them up.



1. BARBELL CURL

Why he does it: "Barbell curls are the mack daddy of all biceps exercises," Jose pronounces. As such, they have been a staple in his arm training since he was 10 years old. Yes, he has been training that long. "It puts your wrists in the fully supinated position so you use as much biceps as possible, and it also allows for the heaviest resistance possible."

How he executes it: Some bodybuilders like Arnold were famous for doing heavy cheat curls with a barbell, but Jose prefers a much stricter style. "I keep my elbows back so the bar stays pretty close to my body at all times," he notes. "Doing them this way, I eliminate the front delts from the movement and get more biceps involvement." The heaviest he goes on barbell curls is 135.

2. ONE-ARM CABLE CURL

Why he does it: "I love these because the tension on the biceps is constant," says Raymond. "At no point is it easier, and there is no sticking point either." He also likes the fact that he can get excellent contractions without having to use a lot of resistance.

How he executes it: Jose adjusts his body position until he finds the exact angle where he can curl, and the cable forms nearly a perfect vertical line as he looks down to the center of his biceps. "If you find yourself curling either in toward your body or away, you need to correct your position," he advises.



3. HAMMER CURL WITH ROPE

Why he does it: Jose is diligent about working all the muscle groups judges will scrutinize onstage, and the brachialis is on that list. He prefers to hit it with hammer curls using a rope attachment and a cable pulley rather than using dumbbells. "Again, it's due to the constant tension the cables provide," he shares. "I am able to get a good stretch and a good squeeze on every rep."

How he executes it: Before starting the set, Jose takes a step back from the cable stack so that there is tension on the cable at the bottom position of each rep. He also positions himself so that there is a straight line from his shoulders down to the ground via the cable. "On any type of curl, you always want to be careful to minimize the involvement of your front delts," he adds.

4. ONE-ARM MACHINE CURL

Why he does it: Jose doesn't perform his machine curls with one hand by choice, exactly. It's more a case of his anatomy not being compatible with the standard two-arm style. "If I squeeze into the machine and grab the bar with two hands, my palms face each other," he explains. "I need to use one arm and angle my torso a little bit away from the working arm to get the proper palms-up hand position."

How he executes it: Jose has tinkered around with various curl machines, and his best bet to get the right fit is to put the seat all the way down as a very tall man would, then kneel rather than sit on the seat. With his triceps flat on the pad, he purposefully curls up and squeezes each rep hard at the top position.

JOSE'S TRAINING SPLIT

Sunday:	Light back and chest
Monday:	Heavy quads, light hams and calves
Tuesday:	a.m. – Cardio, abs, posing p.m. – Chest and triceps, 8-10 supersets lateral raises and rear delts
Wednesday:	Back and biceps
Thursday:	Shoulders and abs
Friday:	Heavy hams, light quads and calves
Saturday:	Arms

ARM WORKOUT

Rope Pushdowns	4-6 x 15
Close-grip Bench Press	4 x 8-12
Seated Overhead Cable Extensions	4 x 12
Dip Machine	
or One-arm Overhead Dumbbell Extensions	4 x 12
Alternate Dumbbell Curls	4 x 15
One-arm Machine Preacher Curls	4 x 12
Barbell 21s	3 x 21
Hammer Dumbbell Curls	3-4 x 10

JOSE'S CONTEST HIGHLIGHTS

2000 NPC USA Championships	Lightweight Winner
2001 NPC Nationals	Lightweight Winner
2004 NPC Team Universe	Welterweight winner
2005 NPC USA Championships	Welterweight Winner
2005 NPC Team Universe	Welterweight and Overall Champion
2005 NPC Nationals	Welterweight Winner
2007 USA Championships	Middleweight Winner
2007 NPC Nationals	Middleweight Winner (accepted pro card)
2009 IFBB New York Pro*	Eighth Place
2009 IFBB Europa Supershow	Ninth Place
2009 IFBB Atlantic City Pro	Second Place
2009 IFBB 202 Showdown at Mr. Olympia	Sixth Place
2010 IFBB Orlando Pro	Third Place
2010 IFBB New York Pro	Second Place
2010 IFBB Tampa Bay Pro	Winner
2010 IFBB Battle of Champions, Hartford	Winner
2010 IFBB 202 Showdown at Mr. Olympia	Fourth Place
2010 IFBB Sacramento Pro	Second Place
2011 IFBB New York Pro	Winner
2011 IFBB 202 Showdown at Mr. Olympia	Third Place
2012 IFBB Optimum Classic, Shreveport	Winner
2012 IFBB British Grand Prix	Third Place, 212
2012 IFBB New York Pro Championships	Third Place, 212
2012 IFBB 212 Showdown at Olympia	Fourth Place
2012 IFBB Sheru Classic, India	Second Place, 212
2013 IFBB New York Pro	212 Winner
2013 IFBB Toronto Pro	212 Winner
2013 IFBB 212 Showdown at Mr. Olympia	Fourth Place, 212
2013 IFBB Phoenix Pro	Seventh Place, 212
2014 IFBB Arnold Classic	Fifth Place, 212
2014 IFBB New Zealand Pro	212 Winner
2014 IFBB Korean Pro	Second Place, 212
2014 IFBB 212 Showdown at Mr. Olympia	Third Place
2014 IFBB Phoenix Pro	212 Winner
2014 Prague Pro	Third Place, 212
2015 IFBB Arnold Classic	212 Winner
2015 IFBB Showdown at Mr. Olympia	Second Place
2015 IFBB Korean Pro	Second Place, 212
2015 IFBB Prague Pro	212 Winner
2015 IFBB Phoenix Pro	Second Place

*All pro shows except 2015 Phoenix Pro were in the 212 division, which was limited to 202 pounds prior to 2012.

5. DUMBBELL CONCENTRATION CURL

Why he does it: Jose used to be all about pushing and pulling heavy weights and make no mistake, he still moves some serious iron. But as the years have gone by, he's become far more concerned with working the target muscle as hard as possible. Concentration curls do just that, providing excellent isolation of the biceps when done properly. "This is an exercise you will see me do at just about every biceps workout," he says.

How he executes it: Jose does these the "old-school" way that men like Arnold and Robby Robinson did in the '70s. That is, rather than sit down and use his inner thigh as a leverage point, he stands and bends at the waist, allowing the arm to hang down. "Your arm should be straight from the shoulder to the wrist," he explains. "If your elbow goes back toward your body or shifts at all during the reps, you're doing it wrong."





6. ROPE PUSHDOWN

Why he does it: Every triceps workout for Jose begins with this movement, as he feels it's the ideal warm-up. "It lets me get a lot of blood into the muscle and around the elbow joints, plus my wrists and elbows aren't in a fixed position," he says. "They're free to move in the pattern my structure needs them to."

How he executes it: Typically, Jose will do three sets of 15-25 reps, moving up in weight on each. His fourth set will start with the stack and be done as a triple drop set. Raymond also likes to incorporate "pause reps" to further ignite the intensity on any extension movement for triceps using a cable. "If I am doing 15 reps, I will do them in three groups of five," he tells us. "The first five will be normal reps, then for the middle five I will hold the contraction on every rep for a full second, then finish with the final five reps at normal tempo again."



7. CLOSE-GRIP BENCH PRESS

Why he does it: This is another arm-training staple Jose has been doing since before he hit puberty. "It's a big-boy exercise," he says, which is an understatement if you've ever seen him perform it. I've seen him do sets with 365 on many occasions, and he has done 405 for 10 reps on video, while on the road in Australia no less. "Like the barbell curl, it hits the belly of the muscle with as much weight as possible."

How he executes it: Everyone's hand spacing will be just a little different, but Jose allows his elbows to flare out and finds a grip that is neither too narrow as to strain his wrists nor so wide as to be more of a chest movement. "If you can touch your chest with the bar, either your grip is too wide or you have your elbows tucked in," he notes.

Normally Jose does straight sets of these, but he also has an insanely intense version that's the perfect finish for any chest and triceps session. It's pretty long and drawn out, which is why we've never filmed it for a video. Simply put, he does 10 reps of a regular-width bench press, then immediately switches to a close grip for 10. He goes back to a regular grip for nine, then close grip again for nine, and so on until he can only get one rep with each. "When I was a teenager I could only use 135, but now I am able to use 225," he says. If you are brave enough to try this, I strongly suggest both using a Smith machine for safety, and going lighter than you possibly think you should. Trust me—the pump and burn in your triceps, especially when done after several extension movements, is absolutely brutal.



8. DUAL DUMBBELL EXTENSION ON INCLINE BENCH

Why he does it: This movement is relatively new in Jose's arm-training arsenal. Five years ago, nagging elbow pain forced him to abandon skull-crushers, which had been a go-to triceps builder for many years. "I was experimenting with some different things using dumbbells, and I found this allowed me to reach back further and get a better stretch for my triceps, while putting much less stress on my elbows." Raymond also likes the unilateral aspect of this movement. Having a dumbbell in each hand ensures that both triceps are working equally hard, rather than a dominant side taking over.

How he executes it: Jose lies back on an incline bench, cleaning the dumbbells to the top position of a press, but with his palms facing each other in a "hammer grip." Lowering them behind his head for a stretch, Jose extends both arms while rotating the dumbbells slightly away from the midline of his body, as shown. This allows for a more complete contraction.



9. DUAL DUMBBELL KICKBACK, FACEDOWN ON INCLINE BENCH

Why he does it: This triceps move is the flip side of number eight, literally. It also happened to be the result of Jose tinkering around in efforts to come up with new exercises he could use. It's essentially just a dumbbell kickback for the triceps, but with two added benefits. It allows both arms to be worked at the same time, and the use of the bench as a stabilizing tool forces stricter form with less body rocking. "For me, it lets me hit the belly of the biceps much better than a standard kickback where you're bent over or kneeling with one knee on a bench," says Jose.

How he executes it: Jose lies facedown on an incline bench so that his upper chest is off the pad. With a dumbbell in each hand, he assumes the top position of a dumbbell row for the lats, and keeps his elbows high and locked in place. From there, he extends his arms back and pauses for a contraction on each rep. "The real key to getting the most out of this is to pause and flex the triceps at the top," Jose explains. "You won't need much weight. I suggest learning the movement with a pair of fives to get the feel I'm talking about."





"I'VE WON THE ARNOLD, MOVED UP TO SECOND PLACE AT THE OLYMPIA, DID AN OPEN SHOW AND ALMOST WON THAT, AND I TEAMED UP WITH A GREAT COMPANY. IT WAS A GREAT YEAR, AND I PLAN ON MAKING 2016 AN EVEN BETTER ONE."

10. OVERHEAD ROPE EXTENSION

Why he does it: Finally, Jose loves overhead rope extensions as a means of hitting the long head of the tri's, the meaty part seen from behind. For many years, Jose did overhead extensions with a heavy dumbbell or barbell. But just as elbow pain made skull-crushers more trouble than they were worth, Jose had to say goodbye to those and switch over to a more comfortable alternative.

How he executes it: Jose rarely does overhead rope extensions as a stand-alone movement. More often, they're part of a superset. The weight isn't heavy, which is the only way one can spread the ropes apart as you extend.

WHAT 2016 HOLDS FOR THE BOSTON MASS

In mid-December, Jose will begin preparing to defend his Arnold Classic title next March. On June 11th, he will make Michela his wife. And in September, he will enter the 212 Showdown at the Olympia as the undisputed number-one contender. And Jose recently signed with BPI Sports, the same company that fellow Massachusetts native and four-time Mr. Olympia Jay Cutler is with.

Jose is very much looking forward to 2016. "I've won the Arnold, moved up to second place at the Olympia, did an open show and almost won that, and I teamed up with a great company. It was a great year, and I plan on making 2016 an even better one."

JOSE'S BPI CUTLER NUTRITION STACK

Pre-workout:	1 scoop Amino Pump
Post-workout:	2 scoops Total Isolate
	2-4 scoops Total Carb
Meal replacement:	2 scoops Total Isolate
	2-4 scoops Total Carb

Ron Harris got his start in the bodybuilding industry during the eight years he worked in Los Angeles as Associate Producer for ESPN's "American Muscle Magazine" show in the 1990s. Since 1992 he has published nearly 3,000 articles in bodybuilding and fitness magazines, making him the most prolific bodybuilding writer ever. Ron has been training since the age of 14 and competing as a bodybuilder since 1989, and maintains the popular website www.ronharrismuscle.com, most notable for its blog "The Daily Pump." He lives with his wife and two children in the Boston area.

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THE TOP 10 BIGGEST BODYBUILDING STORIES OF 2015

As the year comes to a close, MD continues a tradition with the announcement of the top 10 bodybuilding stories of the year. With so many storylines, the task of narrowing the list to just 10 was perhaps more challenging than trying to rank the top-five finalists at this year's Olympia. 2015 was a year of triumph and heartbreak. New superstars emerged, seasoned veterans soared and the IFBB brotherhood said goodbye to one of its own. On behalf of all of us here at MD, thanks to EVERYONE who helped make this a year we won't soon forget!

By Dan Solomon



2012 TEEN
NATIONALS



2013 TEEN
NATIONALS

10. CRAZY FOR CODY!!

We got to know him as a teenager, dominating the competition at the Teenage Nationals, scoring three consecutive titles in the division. His future seemed bright, but few could have imagined how quickly young Cody's career would reach the next level. In July, at just 20



2015 NPC USAs



years old, Cody moved on from teenage competition, entering the NPC USAs. In a remarkable turn of events, the heavyweight from Texas won the overall title, becoming one of the youngest IFBB pro bodybuilders of all time. It's still unclear when the **boy wonder** will make his professional debut, but some are calling it the most anticipated pro debut since the arrival of that kid from Colorado back in 2006.

9. FLEX VS. JOSE

With so much attention on the **Phil vs. Kai** saga, it's quite possible that the sport's most compelling rivalry may actually reside within the 212 division, where Flex Lewis and Jose Raymond have spent the past year on top. While the two maintain a close friendship, their onstage battles have become a high mark on the pro circuit. Earlier this year, Lewis sat in the audience as Raymond won the Arnold 212 title. Six months later, at the Olympia, the two went pose-for-pose, with Lewis coming out on top. These two have become the brightest stars in a division that has emerged as one of bodybuilding's biggest attractions.



8. NPC AND IFBB SHATTER RECORDS

In a year that saw the NPC break records in nearly every measurable category, the record books enjoyed a bit of a shakeup on the pro side as well. The IFBB Pro League gave away more than \$3.4 million in prize money in 2015, more than ever before. Additionally, the popularity of the newer divisions elevated athlete participation through the roof. Ten years ago, a total of 200 IFBB pro athletes competed at the various sanctioned pro events on the 2005 calendar. In 2015, that number jumped to 1,200. Meanwhile, the best of the best competed for a share of a \$1.2 million Olympia prize purse. Yep, that was a record too.

THE TOP 10 BODYBUILDING STORIES OF 2015

7. A TRADITION ENDS ... A NEW ONE BEGINS

For 35 years, from 1980 until 2014, the Ms. Olympia contest was the biggest night in women's bodybuilding. From Rachel McLish to Iris Kyle, the show has enjoyed a rich history since Joe Weider created the event as a way to give women the same high-profile opportunity afforded to their male counterparts. The tradition came to an end this year, when Olympia officials announced that the Ms. Olympia had been removed from the 2015 Olympia Weekend. It was a big blow to the female bodybuilding community, especially following the news that the Arnold promoters had also removed the Ms. International event from their weekend in Columbus. But the news wasn't all bad for the ladies. As it turned out, the crew over at Wings of Strength introduced The Rising Phoenix championships—a new women's bodybuilding event, awarding \$50,000 and a brand-new Jeep to the winner.



6. MCCARVER MANIA

The average age of the Olympia top five is nearly 40. This might explain why bodybuilding insiders have waited patiently for a youth movement to inject some new blood atop the sport. Three years ago, at just 21 years old, Dallas McCarver won his pro card at the North Americans. Earlier this year, McCarver (now 24) showed up at the California Pro for his pro debut. Not only did McCarver easily win the contest but even more importantly, he revealed a physique that appears well on its way to challenge major titles. His rookie season wrapped up in Vegas, where he earned accolades as one of the brightest young stars in the contest.



5. THE PASSING OF BAITO ABBASPOUR

Baito landed on the international bodybuilding scene a decade ago, when he won the welterweight and middleweight titles at the IFBB's World Amateur Championships. He arrived on the pro scene in 2012, earning a victory a year later at the IFBB's Nordic Pro in Finland when he out-conditioned Lionel Beyeke to take the title. Shortly after scoring a top-five finish at the 2014 Olympia 212, Abbaspour was diagnosed with vasculitis, a rare disease that destroys blood vessels, arteries and veins. Despite an outpouring of love and support from the bodybuilding community, the Iranian-born champion died on August 25th. Less than a month later, the Olympia 212 Showdown was dedicated to Baito's memory.





4. ARNOLD CALLS OUT JUDGES!

It started as a typical post-contest Sunday morning in Columbus. The day after the Arnold Classic provides fans the opportunity to partake in a seminar with Arnold. The Q&A session rarely produces anything noteworthy— just the usual assortment of Muscle Beach memories and the occasional Terminator reference. But this year's gathering included Arnold's impromptu, unscripted rant about judging standards and distended midsections. "Call out on those judges!" Arnold declared, "because that's how you create change." The remarks became the biggest story of the weekend, a firestarter on the various forums, securing the former Governor's inclusion among the biggest stories of the year. Arnold proved, yet again, that his voice has become as powerful as the physique that dominated the '70s.

3. THE CURIOUS CASE OF KAI

If you're measuring social media clicks, no story garnered as much attention in 2015 as the mysterious circumstances that caused the number-two bodybuilder in the world to opt-out of his annual clash with Heath. The months and weeks leading up to this year's Olympia had been relatively quiet, until Kai Greene made the announcement that shook the bodybuilding world to its core. While details still remain unclear, Kai's unexpected absence from the contest quickly became the talk of Olympia Weekend. Fans will forever wonder if Kai squandered a golden opportunity to become the 14th winner of the Mr. Olympia. Instead of witnessing another epic showdown between Phil and Kai, we were forced to come face-to-face with a far more complicated side of the industry— otherwise known as the **business of bodybuilding**. Somehow, Kai makes our list without ever stepping onstage in 2015.



2. DEXTER DAZZLES AT 45

Seven years after winning the 2008 Olympia, Dexter Jackson rolled in to Las Vegas as the oldest athlete in the contest. By the time he left town, the soon-to-be 46-year-old was the number-two bodybuilder in the world. Dexter has become one of the most universally celebrated bodybuilders on the planet. His rediscovery of his championship form defies conventional wisdom. The Blade out-conditioned the entire lineup, while picking up a few first-place votes along the way. During his post-Olympia tour, Dexter won titles in Madrid and in Prague, bringing his career victory total to 24 ... just two wins shy of Ronnie Coleman's all-time record. When you add it all up, Dexter's 2015 prize money total eclipsed \$400,000— a new IFBB record.

1. PHIL ... BY A NOSE!!!

When word came in that Phil's biggest threat was opting-out of the contest, most assumed the champ's fifth coronation would be like a trip to the grocery store— he'd pull his car up to the front, leave the engine running, grab what he needed and head back home. Few predicted that the 2015 Mr. Olympia contest would come down to FOUR closely matched rivals, with the champ failing to create any significant distance between himself and his pursuers. During a post-show visit to PBWRadio.com, head judge Steve Weinberger summed up Phil's victory with a stunning reminder of how close the contest was: "If it was a horse race, it was just by a nose."

Fortunately for Heath, a nose is all it took to retain the title. But it wasn't nearly enough to silence his critics. Congrats to Phil on his fifth Olympia title ... and for landing on our list as the biggest story of 2015.







MICHELLE LEWIN

BY TEAM MD • PHOTOGRAPHY BY PER BERNAL

IFBB Bikini Pro Michelle Lewin has become one of the biggest stars of the fitness industry, with a mind-blowing social media following that includes over 6 million Facebook likes. The internationally renowned fitness model and icon has gone from being the girl next door in Venezuela to Miss Worldwide: recognized around the globe for her stunning physical charms and extremely down-to-earth personality.



Michelle Lewin

PHOTOGRAPH BY PER BERNAL





BROUGHT
TO YOU BY



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¹Average weight loss with the key ingredient (200mg green coffee) in Xenadrine Core™ was 10.9 lbs. vs. 5.4 lbs. in a 60-day study with a low-calorie diet, and 3.7 lbs. vs. 1.25 lbs. in a separate 8-week study with a calorie-reduced diet and moderate exercise.

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HIGHLIGHTING THE MOST SIGNIFICANT RESEARCH OF **2015** YEAR IN REVIEW

The greatest temptation is always to look forward and move ahead. However, there is value in looking back at what has passed, and appreciate the beauty of what you have seen.

Several exciting topics were reported on in 2015 relating to testosterone (T). Among this list, a few stand out as having more significant relevance or promise. T has been a controversial and polarizing topic to the public, media and health care professionals since its inception. After a year of now-challenged and potentially discredited papers that called into question the safety of TRT (testosterone replacement therapy) relative to adverse cardiovascular events (e.g., heart attacks, strokes, blood clots), little has been added to the literature. Well, other than a slew of (additional) papers and studies that reported that TRT did not have any association with adverse cardiovascular events.¹

Yet, T continues to face challenges. Just before 2014 ended, the Anabolic Steroid Controlled Substance Act was expanded to include any chemical or product containing (or even claiming to contain) an agent that is either an androgen or possibly even chemicals acting on the androgen receptor.² This means that other than DHEA, which was exempted due to its minimal androgenic or anabolic effects, all prohormones, designer steroids and products adulterated with actual anabolic steroids are treated as Schedule III Controlled Substances. Thus, anyone found to be in possession of such agents would be committing a felony, and if sufficient quantities were discovered, distribution-level charges could be filed. The field of prohormones and designer steroids has long needed to be controlled, but this encompassing reflex action could result in significant (and disproportionate) legal consequences for individuals.

THE POLITICS OF TESTOSTERONE

Pharmaceutical companies looking to introduce new T-based drugs have also been affected by the political prejudice against T. The long-acting T ester Aveed, which provides TRT for periods of eight weeks or more between injections, was finally approved after several delays by the U.S. Food and Drug Administration (FDA), and with uncommon restrictions.³ This same drug has been available in Europe for years in a longer-acting form (due to the higher injection volume) with an excellent safety record. An oral T (T undecanoate) called Rextoro, designed to be absorbed through the lymphatics, avoiding first-pass clearance

and the liver damage associated with 17 alpha-alkylated androgens, was rejected for reasons seemingly applied subjectively.⁴ Conversations with and comments by individuals sitting on FDA approval committees have suggested that the committee members often have little influence over the preordained “recommendation” of the FDA.

Even T products that have been marketed for decades have faced further scrutiny. The aforementioned papers that used databases and statistical weighing to produce an association between TRT and cardiovascular disease, which have been criticized by many experts and stand in conflict with both a *priori* research and subsequent reviews, persuaded the FDA to require a “black box” warning on T-based products warning of the association. On a superficial level, it appears that a criticized, goal-seeking set of papers served to justify placing additional barriers to TRT in men. Certainly, there are cases where TRT has been inappropriately provided or monitoring was not performed. It is legitimate to be cautious in all treatments, though the populations at risk appear to be the aged (over 65), those with pre-existing prothrombotic (form blood clots easily) disorders and those on TRT who are undertreated.¹⁵ However, it does not serve the public good to restrict access to an inexpensive treatment that could resolve or reduce numerous common conditions and provide substantial metabolic and healthy benefits.

A last example of the political and social environment against practical and affordable TRT is the revelation that topical agents are not necessarily safer than injectable versions of T, but also that injectable T may have unique benefits due precisely to the feature that has been tainted as a potentially harmful trait—that being a period of supraphysiologic T concentration.⁶ Topical T formulations have not been as strongly associated with maintaining bone density in men, and certainly

are not sought for muscle mass or strength-enhancing effect. Injectable T esters, primarily the commonly prescribed cypionate and enanthate esters, do provide bone and muscle-building effect, even when prescribed as recommended by the conservative guidelines.

PROMISES AND BENEFITS OF T BOOSTERS

Despite the abhorrence displayed by the media, politicians and conservative professional societies toward T, the public still seeks out T's promise and benefits. T boosters have been sought after and promoted throughout the history of man.⁷ This remains true today, due to the restricted access to prescribed TRT, expense and its limited indications. Many botanical extracts have been shown to induce sexual response among rodents, particularly aged rodents. Certain of these have been marketed to restore sexual desire, arousal and function in aged men as well. It is not surprising, given the extremely low threshold at which sexual dysfunction occurs in humans. It is important to appreciate that human physiology preserves both life-essential and species-essential functions at the detriment of growth. It has been referred to as the “thrive or survive” mechanism, or the theory of “trade-offs.”¹⁸ An example in the scientific literature is the prolonged life span of GH-deficient mice, despite having lesser physical traits that would imply fitness. When forced to make a choice, the body sacrifices muscle and non-vital functions to improve survival during adverse conditions. When conditions are barely sufficient, the ability to procreate takes precedence over the condition and strength of the individual. These are the laws of nature that have allowed our species to survive periods of drought, famine and war.⁹

D-ASPARTIC ACID (DAA)

Men who are suffering from a T-related loss of sexual desire, or experience erectile dysfunction, are

TWO THOUSAND FIFTEEN WAS A BIT OF A DARK YEAR FOR T AND AAS. SO WHAT LIES AHEAD?



FORMULA 19

The origin of this product dates all the way back to the 90's. At a very young age, I was mentored by a brilliant man, and I don't use the word brilliant loosely. This mentor happened to be a bodybuilder who was also pioneering a customized degree program from UConn based around Exercise Science and Chemistry. This gentleman was the first to preach the importance of the Anabolic Window to me. It is at times argued, but universally understood, that within 60 minutes post-workout, your body becomes a nutritional black hole. Your body is ready to suck up everything like a sponge. While training hard, you burn up all of your glycogen and stored nutrients, and afterwards your blood sugar is low, leaving your body starving for nutrient-rich recovery.

I have dedicated my body to science for years, data collecting, and trying every possible post-workout concoction under the sun because of this theory. I have tried all sorts of carb sources from grape juice, to sports drinks, to pure dextrose, and more recently, highly-branched cyclic dextrin. I have tried every single amino acid product known to man in every single dose possible. After 19 years of trial and error, I came up with a formula that kept my pumps for hours and accelerated my recovery, as well as dramatically reducing soreness. This concoction consisted of 5 key elements that I was buying separately and mixing together. I began passing my findings on to hundreds of clients who were either speechless, or overjoyed at what was happening to their bodies. I had what I called "The ultimate post-workout concoction" and I was always excited to share it. I had this figured out when I first started Blackstone Labs, but it wasn't until 3 years later where a fan, who had gotten some advice from me on periscope, reached out to me via email to tell me "Thank you so much, this concoction has been amazing! When will Blackstone Labs be putting this out?"

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frequently hypogonadal— meaning T deficient. To reverse these symptoms, again if they are related to T deficiency, requires a very minimal increase in T production or bioavailability. A clear example is the recent example of D-aspartic acid (DAA). A mirror-like twin to the nutritional amino acid L-aspartic acid, DAA has neurotransmitter-like function in areas of the brain. The effect, as demonstrated in a clinical trial reported in 2009, is an increase of total T in the range of 30 percent or greater when given to infertile men with low-normal testosterone.¹⁰ While this is significant—not only statistically, but also related to the metabolic health of these men, as well as the sexual function and fertility of this group—it holds little value as an ergogenic to young men with normal to high-normal T.¹¹ In fact, it appears that DAA acts as a regulator, rather than a booster of T, bringing T values closer to the mean (average) in men with high-normal T. Several studies have called into question its value as a T booster, but it would be more accurate to state that the recipient needs to have a low to low-normal T (and retain the ability to respond with increased natural T production) in order for DAA to provide any benefits. These benefits would be limited to metabolic and sexual function, and likely not reach the elevated threshold necessary to provide an increase in muscle mass or strength.

A large number of the T boosters have similar stories, based upon traditional medicine practices or anecdotal reports. While it is important to realize the value of allowing men with impaired sexual or erectile function the promise of restored potency, the drawback is that many expect these products to extend their benefits to other T-related functions (e.g., muscle mass and strength gains) in young men with healthy T status. While it is possible that a combination of products that affect several different regulatory pathways in boosting T production may be able to provide an anabolic effect, it has not been adequately proven in any independent trials. Bear in mind as well, many of these types of products have been found to be adulterated with a variety of drugs (e.g., Viagra-like drugs, prohormones, etc.) that may result in being disqualified from athletic competitions.¹²

EXTREME DRUG USE AND HEALTH CONCERNS

Mr. Olympia legend Dorian Yates provided an interview in which he openly and frankly discussed some aspects of drug use in professional bodybuilding, among other topics. The disclosure revealed that as expected, the amounts used by many professionals of his era were well in excess of what the typical anabolic-androgenic steroids (AAS) user/misuser would administer. However, it was interesting that some of the best were the most conservative in their approach to drug use, monitoring the introduction of new agents such as insulin or growth hormone for the best dose-response effect. Unfortunately, the less gifted among these men appear to have felt compelled to pursue higher doses and use a greater variety of drug types in their pursuit of size for the sake of size. The era marked by Mr. Yates' title-holding years was exemplified by the increase in sheer size. This led to a marked jump in not only the dose of drugs used, but also in the duration, with many staying "on" persistently.

Fellow Muscular Development columnist Rick Collins, in a phone conversation following the death of a close acquaintance, asked why it seems so many bodybuilders are dying. His question mirrored the basis for a 2014 study that looked at the mortality rate of professional wrestlers—"are they just getting too damn big?"¹³ The wrestlers were found to be dying at a rate approximately 15 times greater than the general public for cardiovascular-related deaths, and the risk of an accelerated mortality (early death) was directly related to BMI (body mass index). Shockingly, drug-induced deaths (e.g., suicide, accidental overdose) occurred at a rate over 100 times greater than the general public! A 2015 case series from Italy reported on AAS-using men who died due to cardiovascular causes.¹⁴ Contrary to the wrestlers (whose causes of death included a variety of causes, not just limited to cardiovascular-related deaths), most of the bodybuilders had BMIs below the obesity cutoff (30); nearly all the wrestlers were categorized as obese by BMI, with some in severe or morbid obesity ranges. The cause of death in many of the bodybuilders involved myocarditis (i.e., inflammation of the

heart), though nearly all demonstrated cardiac hypertrophy (enlarged heart) with some having concentric hypertrophy—a pattern that is particularly dangerous.

A last bit of confusion entered the literature in regard to the AAS trenbolone, highly regarded and commonly used in bodybuilding. Despite a study showing the well-known ability of trenbolone to build "quality" muscle in regard to body composition and physique development, a shadow was cast in regard to the safety of trenbolone.^{15,16} A study looking at the effect of trenbolone exposure on neurological conditions showed greater nerve cell death in the brain—and potentially, changes similar to those seen in Alzheimer's disease. The greatest concern lies more in the environmental exposure due to runoff from cattle feedlots affecting pregnant women and infants, as much as adults. It is unclear as to how this relates to "cycling" practices seen in bodybuilding.

A DARK YEAR FOR T AND AAS

Two thousand fifteen was a bit of a dark year for T and AAS. So what lies ahead? It is likely that the political contention and restrictions will continue, especially as 2016 holds the Summer Olympic Games, and the anti-doping agencies and law-enforcement organizations thrive (financially) on creating an ever larger "boogeyman" presence of sports doping. Further, there are actions taking place, lacking any transparency (the eternal empty promise of politicians), that will likely further restrict access or increase the cost related to drugs used in treating aging-related decline, and misused for bodybuilding. Agreements such as the Trans-Pacific Partnership will make biologics (e.g., growth hormone, myostatin inhibitor antibodies, etc.) proprietary to select manufacturers. This means lesser supplies, tighter restrictions and higher prices. Baby boomers are no longer looking at well-funded retirements as the stock market looks prepared to correct and the cost of living is increasing at unprecedented rates; no longer wanting a high quality of life as might be offered through anti-aging treatments. Instead, they are forced to "trade off" aspirational goals for necessity. ■

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2015 YEAR IN REVIEW

INNOVATIVE TRAINING TECHNIQUES FOR MAXIMUM MUSCLE

There are many training techniques you can use that sufficiently trigger muscle growth. However, if you're looking for a training edge that boosts muscle growth and power unlike some of the more standard resistance-training methods typically employed, then here are several of the more impressive weight-training approaches highlighted by Muscular Development in 2015 that possess an uncanny ability to accelerate muscle growth and strength. These cutting-edge techniques robustly enhance mechanical tension and metabolic stress within the muscle cell for improved strength, while also stimulating the production of anabolic hormones that drive the hypertrophic process, triggering considerable gains in muscle mass as well.

BOOST STRENGTH WITH CLUSTER SETS

One of the more impressive muscle-building techniques covered this year in MD involves the use of cluster sets. This type of training involves breaking up one complete set into "mini-sets," where you only perform roughly one-third of the total repetitions that you would normally perform for a complete set. After the first mini-set, you rack the weight and wait 10 to 30 seconds, then perform successive mini-sets until you surpass the total number of repetitions that you would normally perform without interruption, by at least one repetition. For instance, let's say you can bench press 275 pounds for five successive repetitions. Well, during a cluster set you would lift the 275 for the first mini-set within the cluster for two repetitions, rack the weight, wait for 10 to 30 seconds and repeat two more times, or for two more mini-sets, within the first cluster. This would give a total of six repetitions with 275 pounds, meaning you've effectively performed one more repetition within the cluster set than you normally do during a regular set, with no rest between repetitions.

REPLENISHED PHOSPHAGEN SYSTEM IMPROVES WORK CAPACITY

The key muscle-enhancing stimulus from cluster set training centers on the increase in repetitions performed during a cluster set relative to a standard set. This effect has the ability to potentially trigger considerable gains in muscle growth and strength. So, what is it about cluster set training that allows the performance of additional repetitions? It has to do with the rest periods between mini-sets that, as I mentioned before, must be as long as 10 to 30 seconds to sufficiently restore energy levels within the muscle cell. This restored energy capacity then fuels the additional muscular contraction required for those extra repetitions. The requirement for the 10- to 30-second rest period is due to the fact that intense weight training mainly burns ATP and phosphocreatine (PC) to provide the energy required for muscular contraction, and 10 to 30 seconds is the exact amount of time required to sufficiently replenish the ATP and PC stores within the muscle cell.¹

INCREASE TRAINING VOLUME FOR SUPERIOR MUSCLE GROWTH

The improved energy status within the muscle cell brought on by cluster set training has been shown to increase training volume capacity. In fact, one study by Iglesias-Soler et al.² showed that subjects using cluster sets increased the total number of repetitions consider-

ably during their workout, compared to when the same group of subjects performed the same lifts while using traditional sets. Moreover, a second study by Girman et al.³ also showed that cluster set training generated a lower amount of lactate while performing a similar workload relative to traditional training. Since lactic acid accumulation tends to inhibit muscular contraction, the lower amount of lactate produced while cluster set training indicates that cluster set training will allow completion of more repetitions which should, once again, stimulate greater muscle growth.

GET BIGGER, STRONGER AND MORE POWERFUL WITH PLYOMETRIC TRAINING

Another remarkably potent training tool that is somewhat misunderstood, and therefore misapplied, is plyometric training. While many believe plyometric training involves simply jumping up and down to improve vertical leap performance, the truth is correctly performing plyometric training can induce tremendous gains in muscular power that, when combined with intense resistance training, can also effectively increase muscular size and strength. Moreover, plyometric training can be used to train more than just your legs. In fact, plyometrics can be used to train most body parts, including the upper body. So, while many dismiss plyometric training as solely for the athlete, the ability of plyometric training to increase muscle size and strength, especially when used

in conjunction with weight training, makes it a great training modality for anyone trying to get in better shape.

PLYOMETRIC WORKOUTS

The standard plyometric workout consists of five to six sets within the five- to eight-repetition range, and approximately 90 seconds rest between each set. The most effective plyometric exercises typically utilize just your bodyweight with no additional resistance. Some of the more popular and effective plyometric movements include box jumps, squat jumps and plyometric push-ups, which are one of my favorite plyometrics that I add as a finishing movement on bench press day, resulting in noticeable gains in the bench press.

CORRECT PLYOMETRIC TRAINING UNIQUELY STIMULATES MUSCULAR CONTRACTION

Like most training methods, plyometrics must be done correctly to be effective. With plyometric training, that means the movement must

Here are several of the more impressive weight-training approaches highlighted by Muscular Development in 2015 that possess an uncanny ability to accelerate muscle growth and strength.

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be performed very rapidly to efficiently stretch the trained muscle during the eccentric phase. In addition, the concentric contraction must instantaneously follow the eccentric phase.⁴ The quick stretch of the muscle tissue during the eccentric phase triggers certain sensors within muscle tissue known as proprioceptors that reflexively boost muscular contraction force during the concentric phase.⁵

PLYOMETRICS ENHANCE MUSCLE ACTIVATION

Of course, enhanced muscular contraction during the concentric phase from plyometric work will conceivably contribute to gains in muscle size and strength on its own. However, the most powerful training effect from plyometric movements stems from the substantial increase in CNS-activated muscular contraction, which not only improves power but should also yield greater gains in size and strength—as enhanced power production stresses the muscle tissue, likely triggering gains in size and strength. In fact, several studies show that plyometric training effectively increases muscular contraction intensity due to an increase in neural recruitment of additional muscle fibers^{6,7}, which enhances size, strength and power^{8,9}, thus validating the notion that increased power from plyometric training can drive strength and hypertrophic gains.

COMBINING PLYOMETRICS WITH WEIGHTS SYNERGISTICALLY BOOSTS MUSCLE POWER

Because resistance exercise increases the size and contraction force of individual muscle fibers, while plyometric training primarily increases the quantity of muscle fibers contributing to muscular contraction, combining plyometrics with weight training should theoretically provide a synergistic increase in contractile forces by making each individual muscle fiber stronger—while simultaneously increasing the activation of these larger, more powerful muscle fibers, ultimately resulting in superior strength production. In fact, several studies have confirmed that plyometric training combined with weight training produced vastly superior gains in muscle strength and power, relative to using either training method alone.^{10,11}

USE CHAINS FOR STRENGTH GAINS

Hanging chains on the bar while lifting weights may seem like something only elite powerlifters do to maintain their incredible strength and power. You may also think that this medieval-looking apparatus couldn't possibly have much of a positive influence on the training effect, especially compared to all the modern-day machines and equipment available in most gyms today. Well, truth be told, chains are probably one of the most effective ways to increase strength.

The potent influence that chain-loaded training has on strength occurs because properly positioned chains on the barbell, that settle to the ground one link at a time during the descent portion of the movement, effectively decrease the resistance on the bar as more and more links in the chain rest on the ground. On the other hand, going in the upward

direction lifts the chain off the ground one link at a time, increasing the resistance of the bar throughout the ascent phase of the lift. When the decrease in resistance from the chains on the way down adequately matches the decrease in muscular force that naturally occurs during the movement, or when the increase in resistance from the loaded chains matches the increase in force production in the muscle, the chains effectively provide what is called accommodating resistance.

The primary result from accommodating resistance is a relatively greater velocity of the bar throughout the entire movement, which is essential for maximizing strength, as greater velocity on the bar throughout the movement preferentially stimulates the growth of the more powerful fast-twitch muscle fibers while increasing neuromuscular efficiency, which collectively promotes tremendous gains in strength.

PROPER CHAIN LOADING

In general, when the lift is easier to perform at the top of the lift and harder to perform at the bottom of the lift, it is amenable to chain-loaded training, meaning that the use of chains will result in accommodated resistance, which will likely generate strength gains. These lifts are said to have an “ascending strength curve,” meaning as you ascend in the movement, strength potential increases. Most standing lower body lifts, including the squat and deadlift, have ascending strength curves, along with other common lifts like the bench press—as they all produce the greatest force at the top of their respective movement and are, therefore, responsive to chain-loaded training. In addition to knowing what chain-loaded lifts to perform, it is also essential to know the best combination of free weight and chain resistance to use for developing maximum strength. Several reports indicate that using 65 to 85 percent of your one-repetition maximum (1RM) combined with 15 to 35 percent of the total load in chains should produce optimal strength.^{12,13,14}

PREFERENTIALLY TRIGGER FAST-TWITCH MUSCLE FIBER

Because training with chains inherently increases the velocity of the bar, the use of chains plausibly activates fast-twitch muscle fiber contraction over slow-twitch muscle fibers. This is based on a well-established rule called the size principle, which asserts that more force production required by the muscle preferentially activates the larger, fast-twitch muscle fiber. The requirement for greater force production when bench-pressing at high velocity is based on the simple relationship between velocity and acceleration, where an increase in velocity also increases acceleration, and according to the well-known equation (Force = Mass x Acceleration) the increased acceleration of the bar increases the force required to lift the bar. Consequently, the preferential activation of fast-twitch muscle fibers from this training approach should improve bench press performance, as fast-twitch muscle fibers produce much more force relative to slow-twitch muscle fibers. ■

For most of Michael Rudolph's career he has been engrossed in the exercise world as either an athlete (he played college football at Hofstra University), personal trainer or as a research scientist (he earned a B.Sc. in Exercise Science at Hofstra University and a Ph.D. in Biochemistry and Molecular Biology from Stony Brook University). After earning his Ph.D., Michael investigated the molecular biology of exercise as a fellow at Harvard Medical School and Columbia University for over eight years. That research contributed seminally to understanding the function of the incredibly important cellular energy sensor AMPK—leading to numerous publications in peer-reviewed journals including the journal *Nature*. Michael is currently a scientist working at the New York Structural Biology Center doing contract work for the Department of Defense on a project involving national security.

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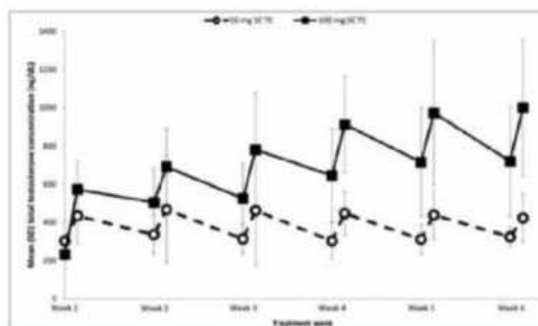
Tired of injections? I mean, they hurt, right? Even if you are experienced at it, they aren't something you look forward to. Unless you have a masochistic side, in which case you can probably skip this month's ARU. For everyone else, today we're discussing the Vibex QuickShot, a device poised to change the way you inject oil-based drugs. It is being developed by Antares Pharma, whose stated mission includes, "Improve[ing] safety and efficacy profiles by minimizing dosing and reducing side effects while improving patient compliance." In other words, they are trying to make injectable medications easier and safer to use. They've just had a study published using their device with testosterone enanthate, and it appears to have been a clear success.¹ Will this device really change everything? Let's take a look.

First, let's review the problem this company is trying to address. Oil-based steroids are viscous (thick), and traditionally given by deep intramuscular (IM) injection. For this type of injection, it is usually recommended to use a long and large bore needle. This means something along the lines of 1-1.5 inches long and 21-22 gauge in thickness. Intramuscular injection can be technically challenging, though, and thus prone to error. This can lead to side effects for the patient. Intramuscular injections can also be painful. This reduces patient compliance and in turn, therapeutic effectiveness. The practice works just fine, but patients and doctors alike have longed for a better solution. It has driven much of the research into alternative delivery methods (gels, patches, implants, etc.).

There has been a change of view on IM injections in recent years, though. Researchers have found it clinically acceptable to give a small volume (1mL or less) of oil-based testosterone injections subcutaneously, or in the fat layer beneath the skin. Once thought incompatible with drugs like T. cypionate and T. enanthate, subcutaneous (SubQ) administration has been shown to steadily deliver hormone to the blood in quite a similar manner. Injecting here can be done with a much smaller and thinner insulin needle, and is considerably less (but still) painful, given the lower nerve density. Many HRT (hormone replacement therapy) patients have switched over, and some anabolic-androgenic steroid (AAS) users are following suit. Subcutaneous administration increases comfort. But we can perhaps do even better still.

Enter QuickShot. This device is an auto injector, similar to an insulin pen. It works via a spring-loaded mechanism, which is triggered when the unlocked unit is pressed against the body. It allows a needle to penetrate only 2.5 millimeters, ensuring subcutaneous delivery. The spring forces the steroid solution through a small needle, very quickly. How fast? QuickShot is said to clear a full mL syringe (the maximum load) in less than two seconds! This is interesting, but I haven't got to the best part. At least initially, the device housing was designed to work with a standard 27g 1mL insulin syringe. In theory, you should be able to load it with any oil-based steroid you'd like. Painless, push-button injections from now on, anyone?

But are the QuickShot injections really painless? The study I mentioned in the opening suggests so. Here are the quick details. It was published in the journal *Sexual Medicine*, and involved giving 50 milligrams or 100 milligrams of testosterone enanthate per week to a group of 29 hypogonadal men (average age, 53). The study went on for six weeks. At the end, a near-perfect 28 of 29 men reported the injections to be completely painless. Equally important, both doses of testosterone used in conjunction with the device corrected the low hormone levels, bringing them back up within the normal range. The 100-milligram injections in particular raised serum testosterone to a respectable 895.5 ng/dL (normal is 300-1,100 ng/dL), similar to what we'd expect with IM. In short, it appeared to work as planned.



SERUM TESTOSTERONE CONCENTRATIONS WITH 50 MILLIGRAMS (OPEN CIRCLES) AND 100 MILLIGRAMS (CLOSED SQUARES) OF SUBCUTANEOUS TESTOSTERONE ENANTHATE PER WEEK.

If you are simply looking at the pounds of muscle gained while using it, you are going to be disappointed. Methenolone is simply not as strong as the more common injectables testosterone, trenbolone and nandrolone.

There are still some big unknowns with the QuickShot. To begin with, it is not clear if you will be able to insert your own load into the housing. We also don't know if there is a way to reuse it. Antares presents it as disposable, but perhaps one can manually reset the spring mechanism. If the syringe can't be replaced, or the device reused, utility in the steroid world would be severely limited. We also don't know what the cost and availability will be. We do know it will be prescription only. This will initially limit availability and protect a high price.

If all potential issues are eventually overcome, which is likely once the technology is "out there," it is possible that QuickShot (or something like it) will change the way most people take steroid injections. It is even conceivable that such advancement will change the very landscape of steroid users, opening up the practice to many who were previously put off by injections. Stay tuned! This could be very big.

REFERENCE:

1. Kaminetsky J, Jaffe J and Swerdloff R. Pharmacokinetic Profile of Subcutaneous Testosterone Enanthate Delivered via a Novel, Prefilled Single-Use Autoinjector: A Phase II Study. *Sexual Medicine* 2015;doi: 10.1002/sm2.80.

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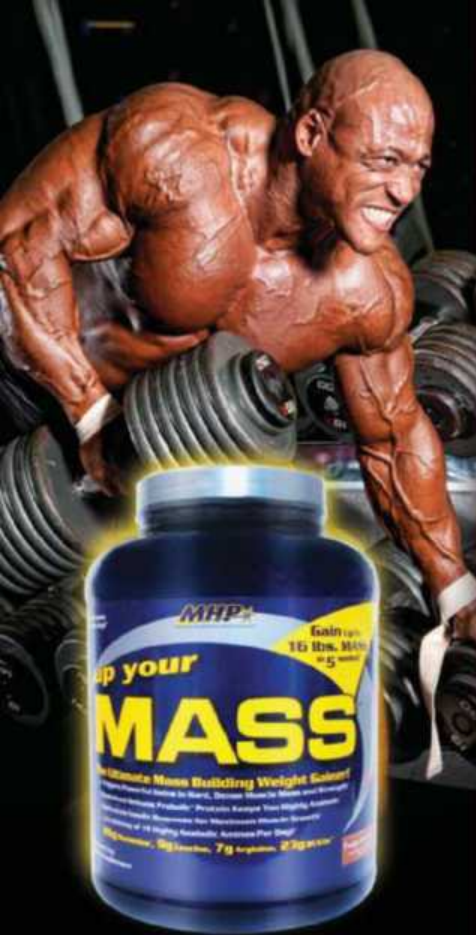
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Craig Richardson may not look like a hardgainer anymore, but like many of you he has struggled with putting on muscular size over most of his bodybuilding career. After years of fighting to get bigger, thicker and more massive, Craig found the key to overcoming the hardgainer struggle: **Up Your MASS!**

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IS PRIMOBOLAN ANY GOOD?

What do you think about Primobolan? Depending on whom I ask, I get completely different opinions. Some like it. A few rave about it. Several others have told me it is junk and a waste of money. I've not tried it myself but have thought about it. I'd like to know your opinion.

I'm not surprised you've been finding such a difference of opinions. People respond to steroids differently, of course, though with Primobolan (methenolone enanthate) it seems a bit more than that. Being a "love it or hate it" compound is kind of its thing. I can speculate as to why. Most basically, the steroid itself is not extremely strong on a milligram-for-milligram basis. I'd say in terms of raw muscle-building potential, it is the lowest of the common injectables. Deca-Durabolin (nandrolone decanoate) and Equipoise (boldenone undecylenate) are measurably stronger in this regard. We may consider methenolone "highly anabolic," but that is in the context of its balance of anabolic to androgenic properties (the classic A/A ratio you may read about). On the same note, methenolone is not estrogenic. Even boldenone and nandrolone present some activity here. This is important, because estrogenicity is a trait that can also support muscle growth, as estrogen plays a couple of indirect roles in this process. People seem to be differently sensitive to estrogen in this

regard too, which might play in to the variance of opinion as to how effective a steroid methenolone is perceived to be.

I believe whether or not you perceive methenolone to be an effective steroid has a lot to do with how much you use and what you expect to get out of it. First, the effective range seems to start at 200-400 milligrams per week, though many venture to 600 milligrams per week and beyond. The higher doses tend to produce more notable effects, of course. With regard to how noticeable these effects are, I'd say that if you are simply looking at the pounds of muscle gained while using it, you are going to be disappointed. Methenolone is simply not as strong as the more common injectables testosterone, trenbolone and nandrolone. It is often considerably more expensive than these drugs as well, which is not going to help win people over. This is where a lot of people determine it is a crappy steroid, I think. They are spending more and gaining less. Now, if you have appreciably low body fat, and are looking for a compound to help you continue to tighten up the physique while potentially pushing growth a little further, you might view methenolone differently. Here, many might really appreciate the milder non-estrogenic nature of the agent. I'd say the best way to sum up methenolone is to say it is a lean builder. It is about quality, not mass. Not a dream mass-builder, but far from valueless.

NANDURABOLIN

Have you heard of a steroid called Nandurabolin? It is supposed to be from Egypt. It is Deca, but only 50 mg/mL. That is very low, so I figured the chances were good this wouldn't be fake. What do you know of this? Does it sound real?

Nandurabolin is indeed a legitimate nandrolone decanoate product from Egypt. It is made by the Nile Company, much better known for its testosterone products. They actually make two versions of Nandurabolin. Yours is the higher dosage. This product also comes in a 25 mg/mL dosage, which if you ask me is unreasonably low from the context of performance or bodybuilding use, at least for men. Even 50 mg/mL can be ridiculous if you want to use much more than 200 milligrams per week. So, as you guessed, this product isn't in high demand. Because of this, you are also correct. It is far less likely to be counterfeited than its 100 and 200 mg/mL counterparts. It is just too easy for a counterfeiter to duplicate

a 200-milligram product instead. It will be quicker to sell, and fetch a much higher price. I can tell you that I have never located a fake version of Nandurabolin. Though it is possible some exist, I think the product is just too low on the radar. Buying on the black market is inherently very risky (I assume, as you don't sound like you are in Egypt), of course. This means there are no guarantees. ■

Got a question for William Llewellyn? You can ask him directly on the MD website and have William personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for William Llewellyn.

William Llewellyn's books (ANABOLICS, UNDERGROUND ANABOLICS and SPORT SUPPLEMENT REFERENCE GUIDE) are now available as e-Books on Amazon, Barnes & Noble and iTunes.



Nandurabolin is a legitimate nandrolone decanoate product from Egypt.

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Marco Rivera
IFBB Pro • Team MHP

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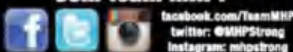
To enhance its already powerful anabolic/anti-catabolic properties, Probiotic-SR contains a patented Sustained Release Micro-Feed Technology that extends the release of amino acids even further for longer anabolic action. This breakthrough delivery technology is so advanced, it's patented.

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*"Soy dairy protein blend and whey protein ingestion after resistance exercise increases amino acid transport and transporter expression in human skeletal muscle." Reidy, P.T. et al., Journal of Applied Physiology, April 3, 2014.
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MAKE MASS YOUR MISSION

WE BREAK DOWN WHY **ALL-NEW MISSION1™** PROTEIN BARS FROM MUSCLETECH® ARE THE CLEANEST ADVANCEMENT IN FUNCTIONAL NUTRITION TO HELP YOU BUILD SOLID MASS

Besides a solid training program, getting enough protein is the single biggest factor in seeing results. The International Society of Sports Nutrition recommends a daily protein intake of 1.4 to 2 grams per kilogram of bodyweight for bodybuilders—this means a 90-kilogram (or 200-pound) bodybuilder would need to consume 180 grams of protein daily to meet this requirement. But netting this much protein can get both time-consuming and expensive if you're cooking up mounds of chicken breasts, steak and eggs on a regular basis. That's why many bodybuilders have a high-protein bar in their mass-building arsenal as a convenient option when they're rushing through their day and need a quick hit of nutrients to support recovery and growth.

But choosing the right protein bar when you're looking to build lean muscle can be an uphill battle. Most bars on the market are packed with either sugar or sugar alcohols, making them essentially candy bars that add little nutritional value to your muscle-building diet. So what should you

look for in a protein bar? To start, you'll want to make sure it delivers the highest quality milk-delivered protein sources that supply all the essential amino acids you need to build muscle. Researchers emphasize the importance of complete protein sources like dairy for building muscle, since these have the highest biological value. This means your body can make better use of the protein to help you pack on muscle, unlike the inferior protein sources such as collagen. Researchers agree that whey, for example, is among the best proteins in terms of digestibility and assimilation in the body, and also supplies plenty of leucine and BCAAs to help trigger and sustain protein synthesis.

A good bar should also help you meet your increased calorie requirements when you're training to build muscle. And for lasting energy, you'll want a bar that packs a ton of fiber.

MuscleTech® researchers have perfected a bar that combines clean, quality calories with an incredible flavor profile that beats the sugar-loaded junk saturat-

ing the market. Mission1™ Protein Bars deliver up to 21 grams of the highest quality whey and milk protein isolates and up to five grams of net carbohydrates, with only one gram of sugar and zero grams of sugar alcohols. They're sweetened with stevia and have no artificial flavors or colors, making them the cleanest bars you can put in your body when you're putting in work. Other bars on the market can have up to four grams of sugar and six grams of sugar alcohols, are packed with artificial flavors and colors, and contain inferior protein and carb sources, making them little more than candy bars that have no place in a clean muscle-building diet. That's where Mission1™ Protein Bars are different.

If you're serious about getting results, you should never miss an opportunity to top up your nutrient stores and give your muscles what they need to recover and grow. Having a convenient, protein-packed option like a Mission1™ Protein Bar when you're rushing through your day is a good way to stop catabolism while simultaneously promoting muscle-building, so make it a non-negotiable part of your mass-building diet. ■

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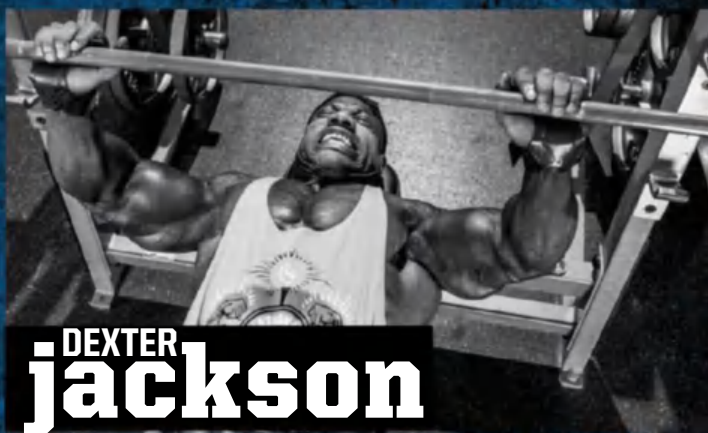
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¹Subjects combining the core ingredients in MuscleTech® Premium Whey Protein Plus (creatine and whey protein) with a weight training program gained 70% more lean muscle than subjects using regular whey protein (8.8 vs. 5.1 lbs.). Read label before use. © 2015

ARE SPLITS OR FULL-BODY ROUTINES *BEST FOR BEGINNERS?*

DO YOU BELIEVE THAT BODYBUILDING BEGINNERS CAN MAKE GOOD PROGRESS ON A SPLIT ROUTINE WHERE THEY TRAIN ONE OR TWO BODY PARTS A DAY WITH MULTIPLE EXERCISES FOR EACH, OR WOULD MOST BE BETTER OFF STARTING ON FULL-BODY ROUTINES DONE EVERY OTHER DAY WHERE THEY JUST DO A FEW BASIC COMPOUND MOVEMENTS? I ASK BECAUSE I DON'T SEEM TO SEE ANY BEGINNERS DOING FULL-BODY ROUTINES WITH THE BASICS ANYMORE.



Even for a beginner, I don't see the point in trying to work the whole body at once. I am a firm believer in using the barbell basics, especially for beginners and intermediates. The way I would have a beginner train is to do three days on, one day off, splitting the body into pull, push and leg days. I would do the pull day first so that you aren't deadlifting and squatting on consecutive days. So day one would be deadlifts, chins, barbell rows and dumbbell rows. Day two would be flat bench, incline bench, dips and skull-crushers. Leg day would be day three, with squats, leg presses, stiff-leg deadlifts, leg curls and calf raises. This way, every body part would get hit twice a week, or technically twice every eight days. A beginner could stick with that routine for anywhere from two to six months and build a good base, before splitting the body up into more days and doing more exercises for each body part.

When you are just starting out, you need to spend a little time just learning all the basic exercises. Too many guys start out on machines, which is wrong in my opinion. Free weights force you to learn balance and coordination, so you should start off with those— using light weights, of course— learning how to do bench presses, squats, deadlifts, barbell rows and military presses. You need to learn how to feel the muscles work too, before you go off and start doing a split routine of one or two body parts at a time. I would never advise a beginner to start training the way I or the other pros do now, after we have been training for 10 or 20 years. When I started out, I divided my workouts up into three days, and I would train every other day or more often, three days a week. So on Monday I did chest and arms, Wednesday was back and delts and Friday was legs. When you are starting out, you get very sore and you need more time between workouts. As time went on, I split the body up into more training days and would train four or five days a week. My body could handle more work, and I was able to put more effort into each body part. That's a good way to do it.






DALLAS McCarver

Doing a whole-body routine can be productive, but I'd say really only for a total beginner who needs to learn the basics of form and needs to build up a base of strength. Maybe a beginner could do something like that for about a month or two. After that, I would still want to see them focusing on the basic compound movements for the most part, but I would divide the body up. That would be push days where you would train chest, shoulders and triceps, pull days for back and biceps, and a leg day. The reason I don't feel that full-body routines would be a good idea is that it's just too much muscle mass to work in one workout. Even if you were only doing a couple of exercises for each body part, you would still be fried by the time you got to the last one or two body parts. You can only put out so much effort at once. By dividing the workouts into three different training days, you are able to focus your energy and efforts a lot more efficiently on those areas. You could also use more volume for the individual muscle groups because you aren't pacing yourself the way you would if you had to get through the entire body at every workout.



BRANCH Warren

When you're a beginner, you'll make progress on just about anything as long as you're training hard. I started off as a teenager doing a full-body workout, just because I didn't know any better. I was looking to see all the different exercises the big older guys were doing, and I would do those. It really didn't occur to me for a little while that I probably shouldn't be doing all of them every time I went to the gym. It would take me well over two hours, maybe more like three. But I still think it's a really good idea for beginners to do a routine that's made up of just a few basic lifts so they build a base. It shouldn't take more than around two months of that before you're ready to move on to more of a standard split where you train just a couple of body parts at a time.



"When you're a beginner, you'll make progress on just about anything as long as you're training hard." —Branch Warren

EATING TO STAY ANABOLIC

HOW LONG BETWEEN MEALS?

I HAVE HEARD THAT YOU ARE SUPPOSED TO EAT EVERY TWO HOURS TO STAY IN AN ANABOLIC STATE. OTHERS ADVISE THAT YOU EAT EVERY TWO TO THREE HOURS. I GUESS YOU SHOULDN'T GO MUCH LONGER THAN THAT, BUT DOES IT REALLY MATTER IF YOU EAT EVERY TWO HOURS OR EVERY THREE, AS LONG AS YOUR TOTAL PROTEIN INTAKE FOR THE DAY IS THE SAME?

You have to think not only in terms of how many hours apart your meals are, but also how large those meals are. As a bodybuilder, you don't want to eat very large meals except on special occasions. Eating smaller meals more frequently, like every two, two and a half or three hours at the most, will boost your metabolism. Your food will be digested more efficiently, and you will be able to absorb and utilize more of the nutrients. I suppose it doesn't make much difference whether your meals are two or three hours apart. Me myself, I like to space them two to two and a half hours apart. That's where I am able to digest them properly and build up enough of an appetite to eat again.

DEXTER
jackson



DENNIS
wolf

Let's start by agreeing that the way most people eat, three meals a day, is not going to be enough for bodybuilders. Let's say you are 200 pounds, and you need 300 grams of protein a day. Even if you could eat 100 grams at once for three meals, I doubt your body could use all of that at once. So we need to divide up the servings into five or six meals. If you do the math and see how much time you have between waking up and going to sleep, that gives you a good idea of how much time can go by between meals for you to hit the total number of meals you need. I think beginners don't need to eat as often as more advanced trainers, because they aren't putting too many demands on their bodies yet. When they start training more often, training harder and with more volume, their metabolism will speed up and they will need more food, and more often.

Another thing to think about is whether you are eating to try to gain, or eating to get leaner. I know in the off-season, I usually go three to four hours between meals because I eat more at each meal, and because I have more things like red meat and pasta that take longer to digest. When I diet, the servings are smaller and the food is very low in fat. Something like chicken breast or white fish along with white rice goes right through me. I get very hungry just about every two hours on the dot. I don't think you should ever go five to six hours between meals. That's definitely going to put you at risk of losing muscle mass because of catabolism.

BRANCH warren

I don't think it matters. I have my protein total for the day and I divide it up into six meals. That's what I need to eat from the time I wake up until the time I go to bed. Since I don't sleep more than six hours a night at the most, sometimes that means I get that last meal really late. Ideally, I eat at some point two to three hours after I finish my last meal. When I am in my final 12 weeks leading up to the Mr. Olympia, I don't fly anywhere. It's all local appearances. That way, I can stay perfectly on my meal schedule. When you travel, stuff happens that you can't always prepare for. Flights get delayed or canceled. I bring meals with me, but there have definitely been times when I had to go five or even six hours between meals due to unforeseen circumstances. I do my best not to stress out over it, because that just makes things worse. And of course when I go hunting, I don't stop every two hours to sit down and eat a meal.

My advice is to be as consistent as you can with your eating, every day. Get all the protein, carbs and healthy fats you need. If you are able to eat every two hours and you have the appetite, do it. If you can only eat every three hours, that's what you have to do. You would want to eat a little more at each meal if you are eating five a day versus six. I do think you are really pushing it if you only eat four meals a day, though, and eating three meals a day like a regular person absolutely won't cut it for bodybuilders. That means you are going four to six hours between all your meals, which is too long.



"It's really an individual thing, and I think it has a lot to do with your metabolism and your appetite. As far as staying anabolic, I don't think you're at as big of a risk of losing muscle as most people seem to think."
—Dallas McCarver

DALLAS mcCarver

It's really an individual thing, and I think it has a lot to do with your metabolism and your appetite. I've known some very large men who got huge by eating four big meals a day, which were at least three hours apart if not more. I've also known guys who ate seven or eight meals a day. I think I recall that Dorian Yates used to eat four meals and drink two shakes every day.

As far as staying anabolic, I don't think you're at as big of a risk of losing muscle as most people seem to think. Unless you're someone with a super-fast metabolism and you're starving two hours after every meal, I'm sure you can go three hours between meals and you'll be fine. I personally average two and a half hours between meals. If three hours go by and I haven't eaten, something is wrong! I'm usually starving by then.

You also have to consider what's in the particular meal. A meal that's lower in fat like white fish and rice is going to digest much faster than a meal like a steak and a potato. And if you go and eat something like pizza that's loaded with fat and carbs, you might not even feel remotely hungry for at least four hours. So to just say, "eat every two hours" or "eat every three hours" is silly. There are variables you have to look at. But you make a good point about the protein total. That's probably a lot more important in the long run.

KAI'S 2015 OLYMPIA NO-SHOW

ALTHOUGH ALL THE FACTS HAVEN'T BEEN MADE PUBLIC AND MAY NEVER BE, WE DO KNOW THAT KAI GREENE DID NOT COMPETE AT THE 2015 MR. OLYMPIA CONTEST WITH YOU. SPEAKING PURELY AS A FELLOW PRO ATHLETE, DID IT UPSET YOU TO SEE HIM LET DOWN HIS MILLIONS OF FANS AROUND THE WORLD WHO WERE HOPING TO SEE HIM CHALLENGE PHIL HEATH AGAIN? DID HE MISS A CHANCE TO BEAT PHIL? AND HOW LONG BEFORE THE EVENT DID YOU SIGN THE CONTRACT TO COMPETE IN THE OLYMPIA?

Dexter Jackson

It didn't upset me that Kai didn't sign the contract and didn't compete, because I understand that this is a business. His fans should understand that too. I believe it all had something to do with his new supplement line that he was launching, and he was just looking out for that. Kai probably won't be competing for too much longer, so that company that he's trying to make a success is going to be his livelihood. I'm sure he wanted to compete, but for whatever reason it didn't make good business sense. Now, do I think he missed a chance to beat Phil? Nope. First he would have had to beat me, and personally I doubt he could have. I've added some new size since the last time he competed with me, and my condition was on point, too. Honestly, unless he brought something we've never seen before from him, I think he would have been third place. As for the contract, I signed mine at least three months before the show.

Branch Warren

I hate to speak for anyone else, and I don't know the details about why Kai didn't compete. I know that for me, I wouldn't leave my fans hanging if I knew ahead of time I wasn't going to compete. Again, I don't know if Kai ever intended to compete this year or not. Whatever, that's on him. And I will be honest. As a competitor, I was glad he didn't compete. He's very hard to beat, so it meant that everyone else except Phil moved up a spot. I do think Kai missed a great opportunity this year to beat Phil. I like Phil as a person, but this was the worst I think I have ever seen him. I knew it when we all started pumping up Friday night before the judging. He looked smaller than usual, and his condition was off what he usually brings. He definitely left the door open and Kai could have walked right through. I think Dexter almost had Phil this year. Personally, I would have had him winning based on what I saw right there onstage. When did I sign my contract? I signed it two days after the Atlantic City Pro. I could have signed it earlier based on points, but I didn't want to go into the Olympia on points. I was determined to qualify, no questions asked with a win, and I did.

Dallas McCarver

I really have no idea why Kai didn't compete. I heard 100 different rumors and supposed reasons, but Kai never came out and gave his explanation. One thing I can say after having listened to him talk in person and in videos is that he's definitely the type of man who thinks things through. So for him to decide not to compete, Kai must have felt it would benefit him in other ways more so than doing the show would have. I do feel for his fans, because they had been waiting a whole year to see him go up against Phil again. I can't say if he missed his chance to beat Phil because we don't know what Kai would have looked like this year and if that would have been enough. As for my Mr. Olympia contract, I got it in the mail a few days after I qualified by winning the California Pro in June. I didn't take too much time to send it back, maybe a week.

Dennis Wolf

I have no idea why Kai would not sign the contract. We've all signed it a bunch of times already in the past, and I can tell you there was nothing new that I saw. But in any case, yes I do feel badly for his fans. Kai has one of the biggest fan bases of any of us, maybe even the biggest. I feel it was disrespectful to those millions of fans who waited all year to see their favorite bodybuilder compete. We all compete to win and for the prize money, but we also do it for the fans. Without them, there would be no Mr. Olympia contest, and no sport. We would all be doing this as a hobby, not a career. The fans didn't understand why Kai wasn't competing, because he wouldn't say, so they started a lot of rumors about him not being allowed to compete. I am pretty sure even if he had signed the contract the day before judging, Robin Chang would have let him compete. Robin does an amazing job with the Olympia Weekend promotion, and he wants what is best for the event and for the fans.

Did Kai miss his chance to beat Phil? We will never know. As usual, Phil was off on Friday and looked a lot better on Saturday. I felt all of us in the top four beat him Friday night. The best I feel Kai has ever looked at the Mr. Olympia was in 2012. If he had shown up looking like that this year, there is a good chance he might have finally got the title. As for my contract, I signed it back in June. I had qualified by being in the top five last year, plus I won two more shows after the 2014 Mr. Olympia that each qualified me for 2015.

"I am pretty sure even if he had signed the contract the day before judging, Robin Chang would have let him compete. Robin does an amazing job with the Olympia Weekend promotion, and he wants what is best for the event and for the fans." —Dennis Wolf



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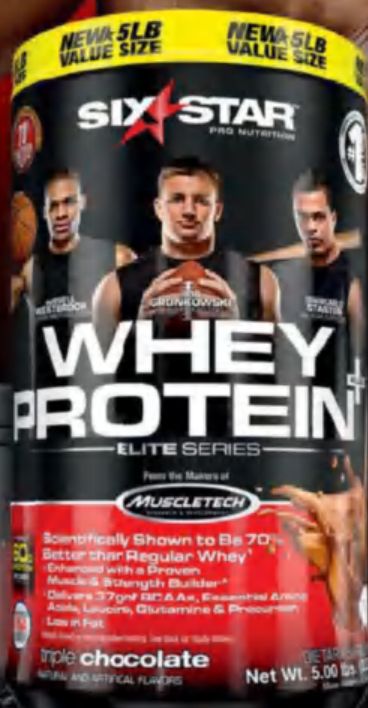
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The Gifted One

BY RON HARRIS

WITH 5-TIME MR.
OLYMPIA PHIL HEATH



WHO THE HELL IS PHIL HEATH? **PART 2**

Phil Heath was signed to an exclusive publishing contract with Weider/AMI shortly after his stunning Overall win at the 2005 NPC Junior Nationals, and a couple months before he turned pro at that year's USA Championships. Thus, only writers for those publications have had the chance to interview him for more than a decade now. However, I did have that privilege in early June of that year, when the biggest title Heath had won thus far was the NPC Colorado State. It's interesting to look back now at that interview, given that he is currently a five-time Mr. Olympia champion.

ON HIS VERY EARLY WEIGHT TRAINING AND GAINS:

"I started weightlifting as part of my basketball conditioning at the University of Denver in 1998. Our training was almost all powerlifting and Olympic lifting, which laid a great foundation for strength. We did a lot of squats, deadlifts. And clean and jerks. In the first two months of freshman year, before we started the season, I was weight training five days a week on top of having three-hour practices on the court. But because I was eating a lot of good cafeteria food, in that time I managed to go from 155 to 175 pounds. I looked like a completely different person."



HOW BASKETBALL LED TO BODYBUILDING:

"That all happened once my basketball career came to an end. It was my last year playing Division I, and I was being scouted by a few NBA teams. I had a tryout with the Phoenix Suns, but it didn't lead to anything. Around that time I saw the 1998 Mr. Olympia contest and was just blown away by Flex Wheeler. I said, 'Wow, that dude is the shit! He's the man. He looks perfect— healthy and athletic.' I used to see him and Shawn Ray on ESPN, and always thought it would be great to have a physique like that. But it wasn't until basketball was over that I really started thinking about getting serious about bodybuilding. I started working out with a couple of guys at my gym, and one of them was competing at the 2002 Colorado State contest. I went to watch him and I was hooked.

Looking up at the guys competing, and knowing what I looked like with barely any training, I realized that I could do very well. Claude Groulx (*note: now retired IFBB Pro from Canada who won the Masters Mr. Olympia*) was the guest poser, and in the lobby some kids saw me in my sleeveless basketball jersey and asked me to compare biceps with Claude. I didn't want to, but it turned out my arms were as big as his, even though I weighed only 185 pounds. Claude told me that I had loads of potential. So on Oct. 8, 2002, I had my official 'before' pictures taken. That was the day I decided to become a bodybuilder."

ON HIS FIRST CONTEST:

"My training partners worked security at a club, and I also started working there. They were always trying to get me to flex my arms or show my abs for the girls. What they were really doing was trying to help me get used to flexing in front of people so that competing wouldn't seem so outlandish. They finally talked me into competing in the 2003 Northern Colorado. I was



more nervous that day than I had ever been before in my life. The ironic thing was that I had played basketball and thrown free throws in front of 20,000 people, playing teams like Ohio State and BYU, and that had never bothered me. I came out onstage with this

big scowl, figuring that looking mean would cover up how scared I was. The only thing that broke my demeanor was that some lady up at the front yelled, "Smile, you're beautiful!" A few women whistled and hollered, and I couldn't help but break into a smile.

"This bodybuilding thing was tough, because I had always played team sports. This was the first time that I would be up there all by myself, and I was terrified. But at 192 pounds after only four weeks of dieting, I won the Novice, the Open Light-Heavyweight and the Overall. I got mobbed after the show and I felt like a rock star. I was so overwhelmed that I cried all night. But I also knew that this was something I was meant to do. I had found my true talent."

And found it he had. Twelve years later, that scared kid is now a five-time Mr. Olympia champion who appears to be well on his way to possibly tying the record of eight wins jointly held by Lee Haney and Ronnie Coleman. It's true that he always had astounding genetics that only needed the right stimulus to be revealed, but hopefully these quotes from Phil made a decade ago show that even the absolute greatest at what they do had to start somewhere. ■

A CUT ABOVE WITH 4-TIME MR. OLYMPIA JAY CUTLER



BODYBUILDER'S SKIN REGIMEN

Hello, Jay! I was wondering if you could tell me what skin regimen you did when you first started bodybuilding? I know you take five showers a day. Now, I do this also, but did you ever break out when you started? I drink lots of water (2 gallons a day), tan about three to four times a week, use an antibacterial soap and wear loose clothes. I have naturally oily skin, and I know this is a genetic thing. I'm so dedicated and have been training for almost five years now. I'm so happy with the amount of muscle I have put on, but this acne is driving me nuts! I'm 22 years old, just so you know I'm past my teenage years.

Well, I did break out some when I was younger. In fact, I still do— but only if I don't shower after I've been sweating. That seems to be the best preventive measure for me— lots of showers! But that's not enough for you, it seems. I guess low-dose Accutane might be the best choice for you. One thing you never mentioned was whether or not you have seen a dermatologist. Your issue sounds like it's a legitimate medical case, so go get an appointment and get it taken care of.

TRAIN SHORTER AND REST

So I've started working with a really knowledgeable and successful natty bodybuilder to bring up my weak parts and generally get contest ready. His theory of training is stimulate not annihilate, high intensity and quick sessions about 30 minutes long. What's your take on this?

I agree with it completely. Unless I am training with a partner, I can complete a workout in 30 to 40 minutes, even for a larger muscle group like back. I split quads and hams up into two different workouts, so I finish those in the same amount of time. Rest periods for me are usually only around 45 seconds, so I can easily do 15 sets for shoulders in 20 minutes. I should add that there are exercises like squats where I do rest longer. And it does make sense to train a little heavier and take longer rest periods at certain times, too. But generally speaking, you should be able to get into the gym, warm up and then hit a body part hard and fast. Training is what stimulates the muscle to grow, but you also need to respect the process of recovery and growth. The more time you spend training, the less time you have to recover and grow.



LIFTING WITH A TORN ROTATOR CUFF

Jay, I have a torn right rotator cuff. I know that's what it is because it happened to my left shoulder about 10 years ago and I had surgery to repair it. The thing is, I am currently without health insurance so I can't even cover the cost of getting an MRI, much less surgery. I'm trying to get a better job with benefits. In the meantime, I can't go heavy at all on pressing movements

“THINK OUTSIDE THE BOX. TRY THINGS LIKE SUPERSETTING DUMBBELL LATERALS WITH MACHINE LATERALS, OR SLOWING YOUR REPS WAY DOWN TO MAKE A LIGHT WEIGHT FEEL HEAVIER.”

for chest, and overhead presses for shoulders are out of the question completely. I'm not so much worried about losing my pecs because they are pretty thick, but I don't have the widest delts in the world and losing size from them is really going to make me look pathetic. Do you think it's possible for me to at least maintain what I have with lateral movements? I should say that I can go very light on machine shoulder presses, but I do mean very light— like a weight I can get for more than 20 reps even after doing all my laterals.

You have a stability issue, so you're smart to avoid any overhead pressing with free weights.

It's good that you can do lateral raises, because there are a few excellent variations to choose from. Besides the standard dumbbell laterals, you can also do machine lateral raises or use cables. I like cable laterals a lot. You can do them in front of the body or behind. I prefer doing them behind the back because you get a better stretch at the bottom. Cables in general allow you to feel continuous tension throughout the whole range of motion, something that isn't possible with dumbbells. You should be able to keep your shoulder size or even add more. Try using different rep ranges from week to week, doing drop sets or come up with supersets to shock the muscles. Think outside the box. Try things like supersetting dumbbell laterals with machine laterals, or slowing your reps way down to make a light weight feel heavier. Keep working on getting that health insurance so you can get that cuff fixed, but in the meantime you should be OK. ■

The Animal Kingdom

WITH 8-TIME MR. OLYMPIA LEE HANEY



THOUGHTS ON THE MR. OLYMPIA

PHIL MAKES IT 5 IN A ROW

First off, I want to say that I was very pleased with what I saw in the top four men. All had very nice lines, balance and symmetry. That's exactly what bodybuilding is crying out for right now. The top two, Phil and Dexter, have absolutely beautiful shape and lines and exemplify those ideals. From the front, I thought both Dexter and Shawn Rhoden gave Phil a real run for his money this year. It was when they turned around that Phil edged them out. I do agree that this was not the best version of Phil we have seen. He was a bit soft in the midsection. Both Dexter and Shawn had him there. But you need to knock the champ out, and even Dexter couldn't deliver that knockout punch.

Special mention should be given to Big Ramy in fifth place. He has all the size he will ever need, and he still has a nice taper and a small waist. No one else looks like this man! All he needs to do now is work on muscle quality and detail. The sky could be the limit for him, as he is still young in the sport.

With five titles, there is now the question of whether Phil will be able to tie the record of eight Mr. Olympia wins held by myself and Ronnie Coleman, and possibly surpass it with nine or more titles. That's tough to say. I still feel Kai has the best chance of beating him. If he comes back in 2016 a little lighter and with his best-ever condition, he has the combination of mass and shape that could do it. He's the only man out there now who can match Phil in the back poses. But Phil has his peaking down to a science at this point in his career. No matter how good Kai looks, he would have to go to battle to take out Phil. And for the sake of the fans and the long and exciting tradition of the Mr. Olympia contest, I hope we all get to see that battle next year!

NO KAI GREENE?

After being runner-up for the last three years in a row, many were anxious to see if Kai would finally be able to take the title away from the champion, Phil Heath. Unfortunately, as we all know now, Kai didn't compete due to a failure to successfully negotiate event contract terms with American Media, Inc. (AMI). It seems like a lot of people had the impression that the IFBB was somehow preventing Kai from competing. AMI and the IFBB are two completely different entities. AMI owns the Weider magazines as well as Joe Weider's Mr. Olympia contest, and the IFBB is the sanctioning body for that event. The IFBB had nothing to do with what happened in the final days leading up to the contest between Kai and AMI. I don't want to comment too much on what transpired, because I don't know exactly what Kai was asking for that AMI was not willing to give him. All I do know is that the Mr. Olympia is a business enterprise that

sells tickets, sponsorships, booth space for the expo and so on. I feel it would have been to AMI's benefit to give a little in whatever negotiations transpired, because Kai Greene is a man who can bring so much publicity and awareness to their event. For the second football season in a row, ESPN has featured Kai in their NFL Sunday Countdown commercials. That's the kind of mainstream exposure you want, just like when I was appointed Chairman of the President's Council on Physical Fitness and Sports by President Bill Clinton. Again, I don't know what Kai was asking for in order to compete. But he is a professional athlete who has to put a value on himself.

We didn't see a rematch of Phil and Kai, and the fans were disappointed. But at the same time, they rallied to him like nothing I've ever seen before in the sport. Everybody loves an underdog! For a brief time, "Kai Greene" was the top-trending topic on Facebook, and USA Today



PHOTO BY DAN RAY

even covered the situation as a news item. I hired a top PR firm in my own competitive days, and even I couldn't get that type of exposure! At the end of the day, Kai and AMI should have been able to come to terms so he would have been in the Mr. Olympia. ■

Would you like to train with eight-time Mr. Olympia Lee Haney? Lee offers both online and personal training for out of town guests. Visit www.lee-haney.com for a complete list of services!

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Got a question for Lee Haney? You can ask him directly on the MD website and have Lee personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for Lee Haney Zone.

Arnold's Corner

WITH 7-TIME MR. OLYMPIA ARNOLD SCHWARZENEGGER

BY RON HARRIS



ARNOLD'S

EARLY MOTIVATION AND GOALS

Arnold has spoken and written about his earliest motivations several times, but in this video interview, "Arnold's Blueprint – Bodybuilding Motivation," he explains his earliest spark to aspire to greatness in a slightly different manner.

"I always believed that in order to be motivated or to work really hard, you need to have a vision in front of you. And somehow, after seeing the world championships in weightlifting in Vienna, and having seen Tommy Kono win the Mr. Universe contest the next day right there at the same event in 1961, and seeing all these muscles and strength and all this, it had a profound impact on me. At the age of 15, I was now determined that I'm going to go into training, that I'm gonna take this seriously, that I'm gonna be one of those guys. I started looking at heroes, muscular guys and heroic guys, and I picked up this magazine that had Reg Park on it. And basically it had him as Hercules on the cover. What a coincidence! Inside was the whole blueprint of his life, of how he became Mr. Universe, the training routine. I mean, if I ever was lost about what to do in life, [then] that is gone. I now have this direction. I realized then that I have a special ability of visualizing things very clearly, because I'm a visual learner. So I saw very clearly in front of me, ME being up there on that podium in London where Reg Park was, and seeing the hundreds of bodybuilders around, with me elevated with the trophy in my hand and celebrating, and thousands of people out there screaming my name. And that to me, that vision, was the motivating factor."

It's been said by various popular self-help gurus that once you have a clear goal and your desire to achieve it is powerful enough, the rest falls into place. Arnold confirms this adage.

"So that drove me to the gym. It was almost so strong that I didn't need

discipline. It just took me there, it just sucked me into that, to train every day, because to me it became like every workout that I do from now on is going to take me one step closer to turning this beautiful vision into reality. So this was the thing that actually motivated me, all the way down to the bone. It became like Mr. Universe, Mr. Universe, train, train, sculpting my body, eating the right way and just staying focused and keeping my eye on the ball. By the age of 20, I'd turned my vision into reality, and I became the youngest Mr. Universe ever. I felt that I was, without any doubt, the new hope in bodybuilding. I didn't feel like I'd arrived yet to where I wanted to be. I felt like I was in the beginning of that, because winning the Mr.

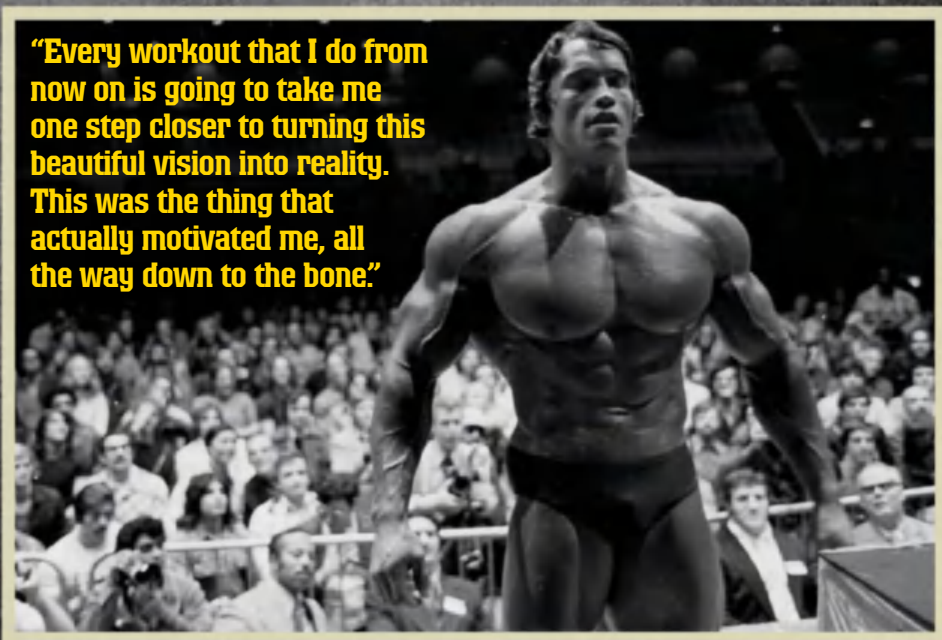
Universe is like winning the Golden Gloves in boxing, or winning the Olympics in boxing. It's far away from being the best fighter in the world."

Arnold was realistic enough to understand that there was still work to do on the diamond in the rough that was his physique. Yet typical of Schwarzenegger, he carefully analyzed what he still needed to become the very best, and soon set off to the USA, the land where he knew he had to go to fulfill his destiny.

"So I realized that very quickly and I said to myself, I have to really earn that, and it will take me some time. There were some bodybuilders in America that were extraordinary, like Sergio Oliva, Dave Draper and people like that, great champions over here. They were ripped, they had much more quality of muscles than I had. They were much more defined, and their posing was much more sophisticated. But I had, without any doubt, the best potential. I was very young. I'm much younger than all of them. So when I came over, I appreciated the excitement that was in the gym, like, "This is the guy from Austria, the guy with the 21-inch arms, this is the guy that's already deadlifting 700 pounds." So there was a lot of good, positive reaction from me coming over here. And there was also some jealousy I had to overcome, but overall it was a really great feeling."

The "new kid" from Europe did improve his muscle quality and definition, as well as his posing and stage presentation. By 1970, at the age of 23, he would finally reach the pinnacle of success in bodybuilding, by earning the title of Mr. Olympia and this, the undisputed greatest bodybuilder in the world. ■

"Every workout that I do from now on is going to take me one step closer to turning this beautiful vision into reality. This was the thing that actually motivated me, all the way down to the bone."



Hardcore Q&A

WITH 8-TIME MR. OLYMPIA RONNIE COLEMAN



TRAINING TO FAILURE?

Ronnie, where do you stand on the subject of training to failure? Some say you should take every single work set to failure or even beyond if you want to grow, others say that's going to burn you out and overtrain you. Some say you should go to failure on only the last set of an exercise, while others don't believe you should ever go to total failure. What does eight-time Mr. Olympia say?

I never really thought about my sets that way. Usually I had a number in my head that was a target for how many reps I would do, like eight, 10 or 12. Twelve was probably my favorite rep range to work in. I always pushed as hard as I could, but at the same time I picked weights and reps that I could do on my own. I think a lot of times when people talk about how they train to failure, they have a spotter or a training partner helping them with the last few reps. What's the point of that?

If they went just a little bit lighter, they could get all those reps on their own. The way I trained was pretty high volume, too, so I probably had another rep or two in me on a lot of the sets I did. But if you're doing a lot of sets, it all balances out. So if you're not going to do a lot of sets in a workout, you should probably push most of your sets to failure where you try for another rep but can't get it. Otherwise, getting close to failure is just as good.

RONNIE'S PETS

I've never heard you talk about any pets. Do you have any?

I have one dog, a boxer. Growing up, I always had two to three dogs at home and a couple cats. I would love to get another dog or two now, but my wife won't let me! She says she's the one who would have to take care of them, and she's right. I do so much traveling for my company that I am hardly home. Ronnie Coleman Signature Series is in 120 countries now, so I have a lot of distributors and retailers to visit and meet with. There are times when I am literally off in

Asia or Europe for three to four weeks at a time. It averages out to 300 days away from home a year now! It's crazy, but I didn't travel anywhere near this much back when I was Mr. Olympia. Joe Weider only had me make four appearances a year, and they were all in the USA. At 12 weeks out from the O, I didn't go anywhere. But I'm not complaining. I love what I do and love owning my own company.

STAYING POSITIVE

Ronnie, you seem like a relaxed, easygoing guy, which is a bit rare in this business where a lot of people are anything but. You have to get angry or upset sometimes— what does it take for you to get to that place?

I try to take things in stride and maintain a positive attitude, so I don't allow myself to get angry very often at all. It's a very negative, destructive emotion. The last time I recall being like that was about 20 years ago when I was working for the police department. I still remember it like it was yesterday. I happened to be having a bad day as it was. Then, I was arresting a guy and he started calling me the n-word. I just lost it. I wasn't nice to him at all. In fact, in the course of arresting him, while he was violently resisting arrest, I hurt him so badly he had to go to the hospital. When I got him to the hospital, I put his head through a wall. No, I'm not proud of what I did, and I haven't done anything like that since.

212 IN THE '90S

If there had been a 212 division for IFBB pros back in the '90s and into the 2000s, who do you think would have dominated? Some think Shawn Ray, others Lee Priest. What do you think?

That's easy! Shawn Ray. He was probably the best pro bodybuilder under 220 pounds that ever lived. The guy got second at the Mr. Olympia twice to Dorian, and was top five at the O for 12 years in a row against a lot of guys who were way bigger than him. Shawn was a guy I looked up to a lot. I even copied his posing routine in 1998, the year I won my first Mr. Olympia! ■

CHECK OUT RONNIE'S WEBSITES

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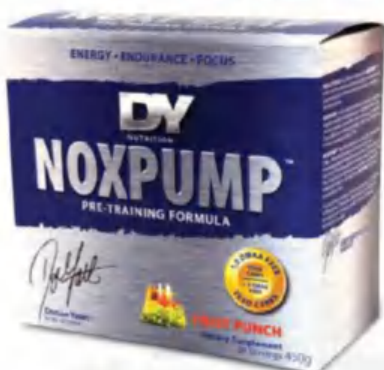


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WITH 6-TIME MR. OLYMPIA
DORIAN YATES



LOOKING BACK AT THE 2015 MR. OLYMPIA

AGELESS DEXTER

Dexter Jackson seems to still be in his prime, at nearly 46 years of age and in his 17th season competing as an IFBB pro. Why do you feel he has been able to enjoy such astounding longevity, and are you impressed by what he is still doing after having been competing so long?

Dexter's longevity is amazing, and even more so because he is maintaining or perhaps even improving his physique at this stage. He seems to play it safe with his training, so he doesn't have any injuries. It's also possible that his ability to maintain his physique well into middle age is related to genetics. Even though the actual age of Albert Beckles has always been up for debate, he definitely competed at the highest levels into his early 60s. He has to be close to 80 by now and still looks fit and healthy. Dexter's physique shows none of the typical signs of aging, such as loose skin or decreased mass and fullness. Maybe he will still be on the Olympia stage at 60!



CAN RHODEN OR WOLF BEAT PHIL?

What are your thoughts on Shawn Rhoden and Dennis Wolf? Do you see improvements in their physiques that would lead you to believe they can be the champ?

I heard some crowd feedback that felt Shawn was in contention for the win on Friday night. He's got a very balanced physique with no weak points, aside from needing more back thickness. Dennis Wolf looks very impressive in some poses, but he doesn't have that same type of balance. The weak points he has, which I won't bother to repeat, are genetic in nature and therefore probably can't be improved on. So of the two, Rhoden has the better chance at possibly beating Phil one day.

WHAT BIG RAMY NEEDS TO WIN

Big Ramy finally broke into the top five this year. What do you see his ultimate potential being? Do you think he is capable of achieving the degree of conditioning that would make him a serious threat to win the title?

From the photos I saw, he still needs bigger calves to match his enormous quads, and he has to get much better muscle separation. If Ramy can make those two things happen, then sure, he has a chance to be Mr. Olympia.

OTHER GUYS ARE NOT A THREAT TO PHIL

Do you still follow the Mr. Olympia contest and get excited about it? Or did you gradually lose interest in it once you were no longer competing in it?

I wouldn't say I follow it anywhere near as closely these days, but I am always interested in how it turns out each year. This year I didn't attend, but I spoke with a good friend of mine who was there to get his report. The last year I am sure I watched the Mr. Olympia was the first year Phil won in 2011. I was in Las Vegas the following two years, but I can't honestly recall if I watched the show or not. I suppose it's not as exciting when you know that as long as Phil shows up in shape, he wins again. The other guys now are good, but they aren't a real threat to him. One thing

that I was a little disappointed to see last year was the heated exchange between Phil and Kai at the press conference, followed up by their shoving match onstage. Bodybuilding shouldn't have to resort to WWE-type theatrics to be interesting.

THE KAI DRAMA

What did you think about the whole drama surrounding Kai Greene in the final week leading up to the Mr. Olympia? Regardless of the situation, do you think he did right by his fans by not competing in the one event they look forward to all year long?

It had a lot of people talking all over the Internet and social media as if it was some great mystery or a conspiracy, but it seemed pretty straightforward to me. For as long as I've known, you need to sign a contract if you want to compete in the Mr. Olympia. There is a deadline for the contract, because the promoters need to know who is competing for purposes of marketing and advertising the event. Kai, for his own reasons, chose not to sign the contract. Where is the mystery? I have no idea why he chose not to sign it. Kai released statements and videos regarding the issue, but he never actually said why. There has been plenty of speculation. We do know that he passed up what would most likely have been another second-place award and paycheck to Phil. Perhaps he did it intentionally in order to generate a storm of publicity for himself that would help with raising interest and awareness for his new supplement company. Who knows? One thing that some seem to have totally misconstrued is that the IFBB banned Kai from competing. That was not the case. Kai eliminated himself from the 2015 Mr. Olympia by refusing to sign the competitor's contract, end of story. ■



The Blade

WITH 2008 MR. OLYMPIA DEXTER JACKSON



TRAINING LAGGING ARMS

If arms are a lagging body part, do you think a person should train them more often? I have heard that some people have seen good results with training arms two or even three times a week.

You can train them twice a week if they are a lagging area, but don't hit them more often than that. The best way to arrange it is to do biceps with either chest or shoulders, and triceps with either chest or shoulders, then give them a day of their own. This is one way you could split that up:

DAY 1: CHEST AND TRICEPS
DAY 2: BACK
DAY 3: LEGS
DAY 4: SHOULDERS AND BICEPS
DAY 5: OFF
DAY 6: BICEPS AND TRICEPS
DAY 7: OFF

You need to keep in mind that your arms are working on chest, shoulder and back days anyway as assisting muscle groups for exercises like presses, rows, chins, pull downs, dips, etc. So hitting them too often on top of that will just get them overtrained. The split I suggested has you working arms on their own day after a day of rest, with another day of rest after that. This will give them the time they need to fully recover and grow. I wouldn't waste your time with too many high-rep sets, either. Work them heavy, at least as heavy as you can while still maintaining good form and squeezing out good contractions on every rep. I truly believe your biceps get more out of curling a

100-pound bar for six to eight reps than they do curling a 70-pound bar for 15. You can do a higher rep set here and there, but most of the time you should try to average eight to 10 reps.

DEXTER JR.

Your son Dexter Jr., who plays pro arena league football for the Tampa Bay Storm, looks like he's grown quite a bit. How tall is he and what is he weighing these days?

My son is 6'2" and he is right around 280 pounds. Just a little guy!

SQUATTING WITH CHAINS

I saw you using chains on the squat machine. Do you like chains for other exercises, too? What advantage do you feel they offer as far as making the exercises tougher or more effective?

Maybe I should have explained why I had the chains on there, because it had nothing to do with trying to change the resistance curve or anything like that. It was just one of those days where I was feeling great and stronger than usual. We worked up to the point where I had put all the plates the machine would hold on it, and I felt like I could still go heavier. Those big chains happened to be nearby, so we said, "Hey, all of those

have to weigh another 100 pounds or so, let's wrap them up on it!" And that's what we did. I have actually tried using chains on a couple different barbell movements, but I didn't feel any difference or feel any benefit, to be honest.

COVERING UP WHILE TRAINING

From a lot of your training videos I have seen, you like to stay pretty covered up when you train. Why is that? Are you actually more comfortable that way, or do you just not want to show off the physique?

It's kind of a superstition thing with me. I just don't like to show off my body before shows, especially in the last eight weeks. You will never see me in a tank top in the last two to four weeks. We've all seen guys post up progress pictures where they look phenomenal at a couple or a few weeks out, then they wind up looking like crap onstage at the show. I never, ever want to be that guy! The only day it really matters is the day of the contest anyway. So I don't care how anybody looks before that, and I won't show how I look leading up to a contest either. I think it's bad luck! Well that, and I think it's a lot more fun to keep people guessing. ■

VISIT DEXTER'S OFFICIAL WEBSITE:

www.dextertheblade.com

Follow Dexter on Twitter: @MrOlympia08 and on Instagram: mrolympia08

Got a question for Dexter Jackson? You can ask him directly on the MD website and have Dexter personally answer you! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for Dexter Jackson.



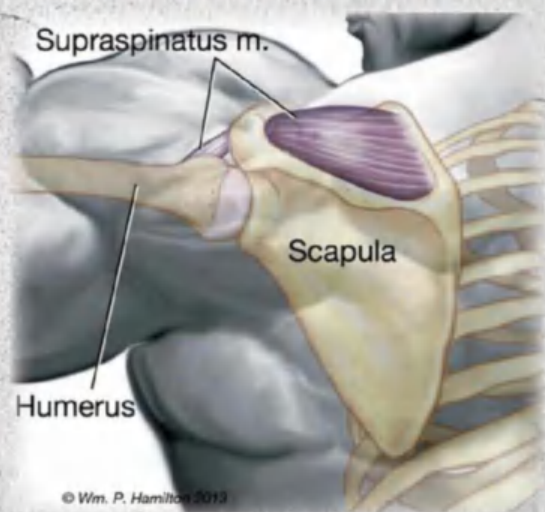
"I truly believe your biceps get more out of curling a 100-pound bar for six to eight reps than they do curling a 70-pound bar for 15."

BUILD THICK DELTOIDS *WITH*

INCLINE BENCH DUMBBELL FRONT RAISES

There is almost nothing that detracts from a great upper body more than capping it with paper-thin shoulders. The shoulder is a complicated structure that has a highly mobile joint, but it has a poor base for stability. That makes it a perfect storm for an injury waiting to happen for anyone who sloppily trains his or her shoulders. Thus, you need to resist the temptation to throw good form out the window in favor of lifting more weight, but that does not give you a reason to opt out of hard shoulder work, either.

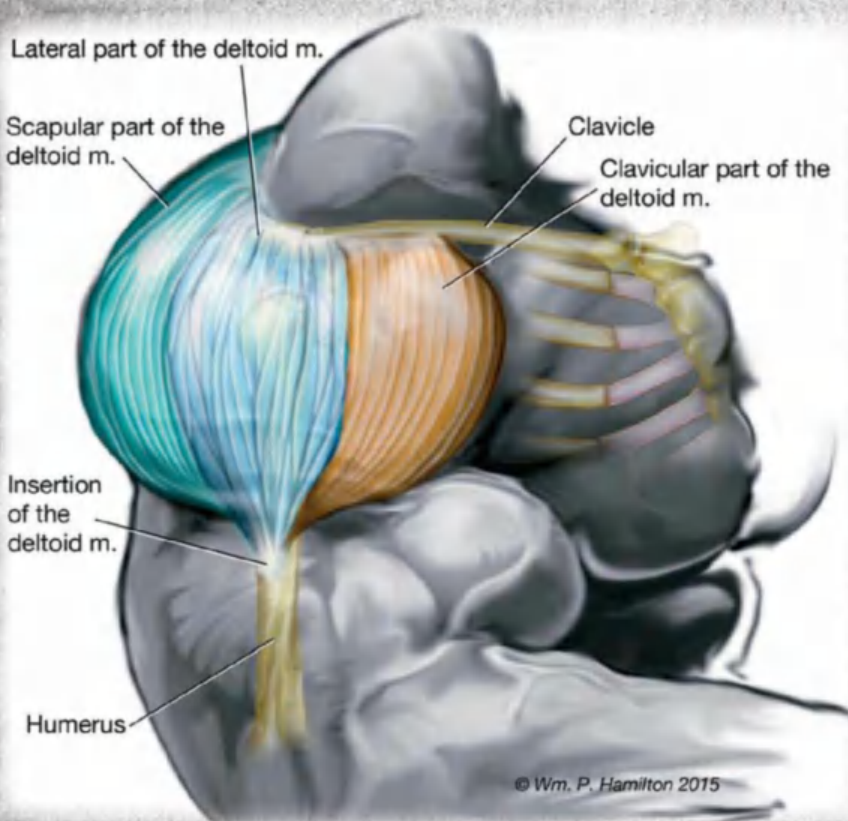
If the anterior (front) part of your shoulder is a bit less developed than what you would like, you should jump into incline bench front dumbbell shoulder raises. This exercise provides an outstanding opportunity to layer on the mass to the anterior (clavicular) deltoid and to a lesser extent, the lateral part of the deltoid, while largely protecting it from compression types of injury that presses might induce. The trajectory of the arm movement in incline bench front dumbbell raises requires shoulder flexion, which is the job of the anterior (clavicular) fibers of the deltoid muscle.¹²



MUSCLE STRUCTURE AND FUNCTION

The deltoid muscle has three primary regions.^{2,3} The clavicular (anterior or front) fibers of the deltoid are anchored along the anterior-lateral part of the clavicle (collarbone). The medial fibers of the deltoid originate from regions between the clavicular and scapular (posterior) part of the deltoid, along the acromion of the scapula (the point of the shoulder). The scapular fibers of the deltoid are the most posterior part of this muscle. They attach along the spine of the scapula (shoulder blade), which is on the upper and posterior side of the scapula.² The fibers of the three regions of the deltoid converge together on the anterior and upper portion of the humerus bone.^{2,3}

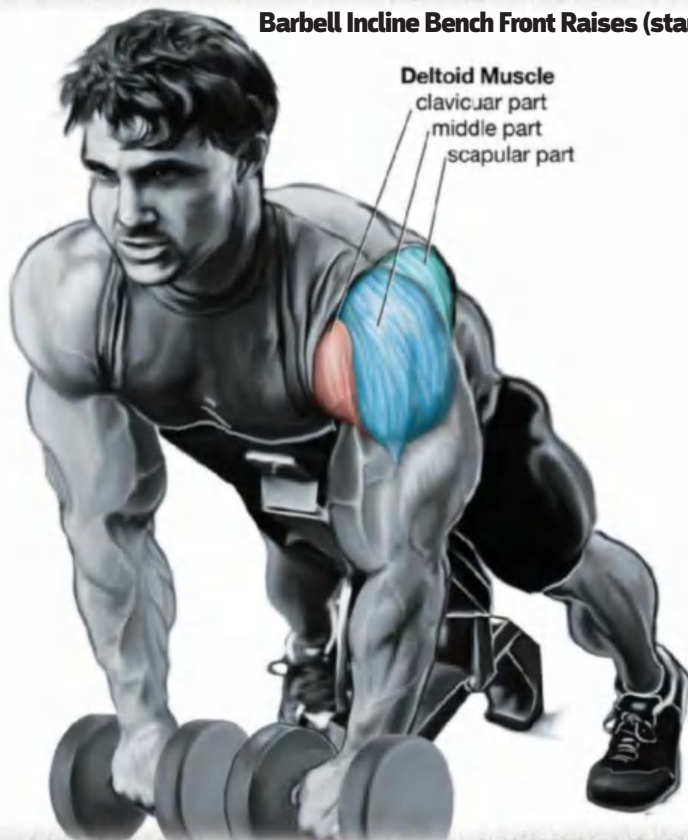
The clavicular fibers of the deltoid produce strong flexion of the humerus at the shoulder (bringing the humerus bone of the upper arm forward)¹ and medial rotation of the humerus at the shoulder.³ It is these fibers that are primarily activated by incline bench front barbell shoulder raises. The medial fibers abduct the humerus bone of the arm (raise the arm away from the side of the body)³ and support the humerus during the lift upward.¹ Thus, the medial region of the deltoid will be activated during incline bench front dumbbell shoulder raises, but it is not recruited to the same degree as the clavicular fibers of the deltoid. The scapular fibers of the deltoid produce strong extension (moving the



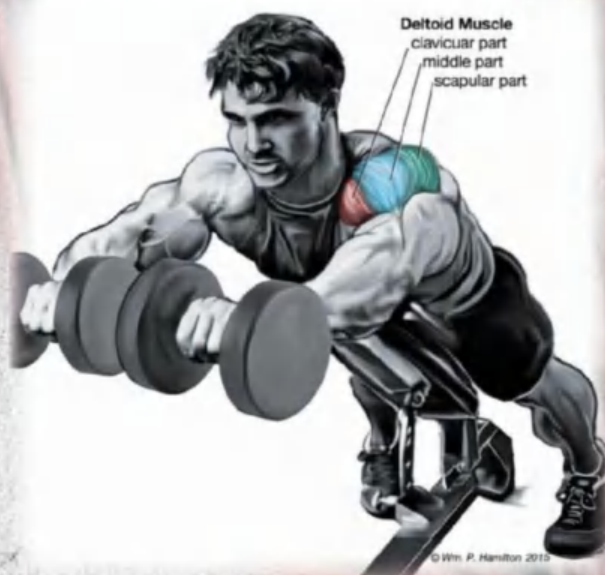
humerus bone posteriorly) of the humerus and consequently, they are not activated by the forward raises in this exercise.

The supraspinatus muscle is one of the rather delicate rotator cuff muscles³ of the shoulder. The supraspinatus is a rounded muscle that lies deep to the trapezius muscle in the supraspinatus fossa. This fossa (a hollowed-out area in the bone) is located on the top part of the posterior side of the scapula bone. The supraspinatus muscle begins near the medial side of the scapula (close to the vertebrae and the center of the body), and runs to the superior part of the head of the humerus bone of the upper arm.² This muscle assists the clavicular part of the deltoid to lift the dumbbells upward.^{4,5} However, the degree of activation and stress is markedly lower than exercises like overhead barbell or dumbbell presses, which really tax the supraspinatus muscle.

Barbell Incline Bench Front Raises (start)



Barbell Incline Bench Front Raises (finish)



Moving the dumbbells upward activates the clavicular part of the deltoid as well as the deltoid's medial fibers.^{6,7} In addition, the supraspinatus muscle of the rotator cuff is very active.⁵ However, if you raise your arms above eye level, you recruit your upper trapezius and serratus anterior muscles^{1,3,4} rather than more completely activating your deltoid muscle.⁸ Thus, raising the bar up farther than eye level will not make this a better shoulder exercise.

If the bulk of your shoulder training consists of heavy overhead lifts, you will develop strong and thick muscles, but this increases the risk for joint injury. While heavy lifting is not inherently bad, you need to consider the shoulder risk associated with lifting iron—and you may not wish to do heavy presses on every shoulder day. For most people, incline bench dumbbell shoulder raises will provide superior isolation of the clavicular part of the deltoid—and to some extent, the medial deltoid—without excessive stress to the shoulder joint. This exercise is so effective because it isolates the deltoid muscle fibers, and it hits these fibers directly and powerfully, with a sustained contraction throughout each repetition. As a result, you can get great results without needing to lift the “super loaded” stuff.

The delicacy of the shoulder joint means that you need to approach this region with cautious intensity, rather than reckless abandon. Thus, if you want to inject new strength into your shoulders, find an empty incline bench and lift away—knowing that your deltoid mass is about to explode. ■

INCLINE BENCH FRONT DUMBBELL SHOULDER RAISES

1. Take a dumbbell in each hand and lie facedown with your head and shoulders hanging over the top of an incline bench. Take a pronated grip (palms facing down) on the dumbbells.
2. Your arms will be hanging straight down toward the floor in the starting position. Slowly lift the dumbbells from this position and pull them up to the level of our shoulder joints. This should be at a level that is at or just a little above a position in which your forearms and upper arms are at eye level. Keep your elbows locked throughout the lift. Take one to two seconds for the lift upward.
3. Return the dumbbells slowly (take about three seconds) to the starting position. Do not let the dumbbells swing past a position where the arms are perpendicular to the floor, or the next upward lift will likely be helped by the pendulum-like momentum rather than muscle force.⁶
4. Immediately start the next upward lift, and repeat until your set is done.

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OPERATION CYBER JUICE: DEA TEAMS WITH USADA

WHY WERE ANTI-DOPING ORGANIZATIONS INVOLVED IN THE OPERATION CYBER JUICE INVESTIGATION?

"Operation Cyber Juice" focused on the underground anabolic steroid black market, and was comprised of over 30 different U.S. investigations in 20 states, resulting in the shutdown of 16 labs and over 90 arrests nationwide. Unlike past investigations such as 2005's "Operation Gear Grinder" and 2007's "Operation Raw Deal," this time, the United States Drug Enforcement Administration (DEA) worked with both the U.S. Anti-Doping Agency (USADA) and the World Anti-Doping Agency (WADA) in a multi-organization collaboration. Travis Tygart, CEO of the USADA, announced: "In the global fight against dangerous performance-enhancing drugs, collaboration between anti-doping organizations and law enforcement is vital. This joint investigation again demonstrates that we can work together to identify and hold accountable underground steroid suppliers and users ..." (emphasis added). David Howman, director general of WADA, stated: "By partnering with USADA and the DEA in this major steroid operation, WADA has been able to prevent potentially harmful steroid substances from getting into the hands of athletes looking for an edge. This is a good example of anti-doping and law enforcement working well together [toward] reducing doping and protecting public health."

But how closely should anti-doping and law enforcement work together? The USADA and WADA are partially funded by our tax dollars, but they are not government agencies. How far should their jurisdiction extend beyond elite sports? The USADA says that more than three-fifths of U.S. adults claim "some relationship to sport-related activities," but should such organizations spread their net over recreational lifters and weekend warriors? Anti-doping organizations justify an expanding global reach based on health crisis grounds. "These substances, either as full steroid products or in raw material form, are being produced in unsanitary 'underground laboratories' with no concern whatsoever given to the labeling of the products, nor to the health of the end user—quite often the athlete, and worryingly, very often young people," asserts Howman. But actually, young people represent a small minority of steroid users, as do elite athletes. Most users are non-

competing adults seeking better-looking bodies.² And while the claim about quality control is valid, an interesting way of looking at that problem's cause is in the context of demand and supply. Underground labs exist largely because U.S. anti-steroid laws have subtracted physicians and pharmacists from the equation, cutting off the controlled source of legitimate, FDA-approved steroid products for "cosmetic" users; the continued demand has been filled by home-brewed products made from raw powders. We simply forgot the lessons about bathtub gin taught by the failed Prohibition of alcohol.

The vast majority of steroid users fall far outside the traditional jurisdiction of anti-doping organizations, but in places outside the United States, the lines are blurring. Anti Doping Denmark conducts doping tests in certain gyms; all gyms are legally required to display a sticker on the entrance door with either a positive or a negative smiley to indicate whether or not testing takes place. Members who test positive are banned from that gym and from all competitions under the Sports Confederation of Denmark for two years—but more than 95 percent of those tested are not competitors.³ The system also funnels doping suspects to the "frowny" gyms for easier investigation by the authorities. In Belgium, anti-doping authorities coordinate with a specialized police unit and those who test positive can be subjected to a search of their residence.⁴ Look back at the disturbing story of Belgian "Boris" in the April 2013 edition of this column. After failing the drug test in his first bodybuilding contest, he was subjected to a police search of his house, two different investigations, a heavy fine of 3,350 euros and a four-year ban on setting foot in any gym.

While anti-doping organizations may claim they don't want recreational users arrested and prosecuted, that seems exactly where their efforts are pushing. Should the USADA and WADA govern the conduct of mature, non-competing bodybuilders? If you think so,



be aware that their rules may restrict and test for an expansive list of "prohibited substances" including prescription medications, recreational drugs and dietary supplements. Under the USADA's control, athletes must report their whereabouts, submit to unannounced testing and even avoid "associating with" a watch list of sanctioned individuals. Allowing anti-doping organizations to seize too much control over underground lab investigations, or over the lives of non-competing lifters in gyms, may seriously undermine American liberties and divert our focus and resources in the wrong direction. ■

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THE 2015 MR. OLYMPIA

—HOW MY CLIENTS DID

Once again, it was exciting to be able to help a few hardworking athletes surpass their previous bests and watch them show it off on the biggest stage in bodybuilding, the Mr. Olympia.

With **Shawn "Flexatron" Rhoden**, we worked on everything this year, not just his back thickness. But of course, back thickness was a priority. One thing we did that led to real improvements was to go heavier on all types of rows: barbell, T-bar, dumbbell and machines. For a lot of his sets, he would go heavy enough to limit him to six to eight reps. Training with much heavier loads, especially when you're not accustomed to it, will bring your muscle density to a new level. Of course, all that really matters in the end is how the physique looks on contest day. Shawn came in fuller than ever, but I think he filled up too much. He was having a tough

time controlling the bottom part of his midsection, and Shawn is always known for having a small, tight midsection. That did hurt him a little. Still, I thought he was right there with Phil in all the front poses. He certainly had more detail in certain areas, such as the delts, than Phil.

Speaking of Phil, some say this was his worst look ever. I disagree. Last year he was worse, and this time was an improvement over that. But in both cases, it's clear to my eyes that Phil is trying to come in too big and full, and sacrificing that dry, ultra-sharp look he has always been known for since he started competing as a pro.

Dexter Jackson, knocking on the door of being 46 years old, nearly had Phil. I was sitting right up front, and as far as I'm concerned, Dexter had him beat. The only two poses Phil had over Dexter were his rear lat spread and rear double biceps. You can argue that Phil is taller and bigger overall, but Dexter is just about perfect. He could put on more size, but that would start taking away from his shape and begin to give him a blocky look. I will take beautiful shape over blocky any day. In terms of condition, Dexter killed Phil this year. Not only do you have to hand it to Dexter for nearly getting his title back, but he's also the only guy up there who paid everything out of his own pocket, without a sponsor footing the bill. And let's not forget that he won the Arnold Classic and the Arnold Classic Australia six months before the Olympia. Dexter seems to have found the perfect formula for hitting both the spring and the fall shows and peaking right, without overly taxing his system. After the last show, he will take a full six weeks off from the gym. No weights, no cardio, nothing. Then he comes back and eases back into training for two weeks before he heads back out to Venice to train with me for the next contest. So far, this schedule appears to be ideal for him.



In the 212 Mr. Olympia Showdown, I trained **Hide Yamagishi**, who placed third, and who had been second to Jose Raymond at the Arnold 212. I thought that one was very close. Jose is shorter and thicker, but Hide has a more classic look with nicer shape. I feel he has brought up just about all his weak points. The only area Hide could still improve on is back thickness. The only problem there is that Hide was competing for years in the open division, in great condition at about 215-220 pounds. Getting him down to 212 is no easy task. So if you go and put more muscle on his back, how do you keep him in the 212 division? I also want to give special mention to **Guy Cisterino**. I've trained him in person in the past. For the Olympia, we worked together over the phone. I would tell him what to do and he would do it. Guy is one of the hardest-training men I've ever seen. At this Olympia, he was just plain overlooked. No way should he have been down in sixth place. As for the 212 division, it's more exciting in some ways than the open. Four-time champion **Flex Lewis** is very good, but he isn't dominating the other guys anymore. Some of the others like Jose and Hide are definitely creeping up on him. This year, Flex was washed out in the midsection and quads, and Jose almost had him just like Dexter almost had Phil. ■

Got a question for Charles? Email it to him at editor@musculardevelopment.com and you could see it answered right here in MD!





"I find it a bit amusing that everywhere I go, people keep asking what the secret is. Brother, there is no secret."

WHAT'S DEXTER'S SECRET?

Congratulations on a great year of success. What is the secret behind Dexter Jackson's Fountain of Youth? I have been following bodybuilding for a long time, and I have never seen anything like it. I remember few years back watching the Arnold, and witnessing the "fall" of Dexter Jackson. Somehow, he joined #TeamFarah and once again started to climb the rankings like never before. I mean, the guy keeps on improving year after year, show after show! It's got to be some kind of secret that you guys aren't telling us. Can you please be kind enough to explain how this is possible?

I love your question but to be honest with you, I find it a bit amusing that everywhere I go, people keep asking what the secret is. Brother, there is no secret. Dexter is very blessed with amazing genetics, and he's working with me. Many of our readers understand that I know a few things about the sport we all love. So honestly, there is no secret. With the drive and dedication that Dexter has, and the hard work that he is putting in, day in and day out—combined with the knowledge—nothing is impossible. Can you smell 2016 Mr. Olympia? I am getting excited just thinking about it, and can't wait to see how my team is going to dominate.

ENOUGH TRASH TALK

Guru, you never seem to surprise me. The more trash talk there is from people on social media, the better your team performs. I was just in Prague (I wrote this on the plane ride home) and I am so happy that I was able to shake your hand, sir. You might not remember me, but you left an amazing impression on my friends and me, and we can honestly say that you have made us more focused than ever. Just wanted to thank you for being so humble and so real. We really thought that big Ramy was going to take it, but I am sure that you were both very happy that he landed where he did—especially since the winner, Dexter Jackson, is also on your team. Hopefully, people will stop talking trash. Good luck in everything you do, sir, and thank you for taking the time to motivate others.

Wow, wow ... that is very nice of you to write this. Sometimes, no matter what we do in life and how successful we become, it seems that some people only focus on the negativity for some reason. I really want to thank you from the bottom of my heart, and I want you to know that your letter made my day, and even my year. I am thankful that we still have amazing people like you in our industry to make my job joyful again, and to make me do the impossible to keep on making champions. Look out for Big Ramy to make even bigger things happen next year.

STICK WITH THE REAL NPC

George, you have always been straightforward with your answers, and I have a very important question to ask. With this new organization forming and sounding like it is going to be good for the athletes, what do you suggest I do? I have been competing in the NPC for a few years now, and it seems that I am moving up the ranks quickly, but I am getting promises that I could make money before I even become professional and it's kind of interesting to hear. What are your thoughts?

It's very simple. Many organizations came along, and where are they now? This is the question that you need to ask yourself. I am part of the NPC and IFBB, and I will always be. If you still want your questions answered in a magazine like MD, or you want your photos to be seen and known by everyone in the world like myself and all my fellow competitors/clients, then I suggest to stick with the real deal. The real NPC has been here for almost four decades, and it keeps on growing for a reason. Here is a question for you: Do you want to be like Arnold, Haney, Coleman, Yates, Cutler, Dexter, Kai, Branch, Wheeler, Ray, etc. ... or the pros in that other federation ... what are their names? I don't think so. I hope this made your decision easier!

George Farah is presenting his opinions and he does not, in any way, shape or form, encourage or condone the use of any illegal or controlled substances.

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OFF-SEASON **PART 2**

QUESTIONS AND CONCERNS

REAL IMPROVEMENTS ARE MADE IN THE OFF-SEASON

Since conditioning is paramount to the success of a bodybuilding competitor, the emphasis during the pre-contest phase has to be on shedding body fat. This is not the time to work on weak points, such as improving your upper back, your chest or your thigh sweep. And along with conditioning, a large part of success in competition depends on having excellent proportion, with no glaring strong or weak points. Since very few athletes can say they have no weak points, the off-season is the time when they can be remedied. This is achieved through proper training, proper intake of nutrients and supplements, and the right amount of cardio.

people do, which is focus on bodyweight gains. Weight gains are nice, but they tell you nothing about what has actually improved.

Another very common scenario is that athletes do indeed compete heavier than they did previously, but without the same conditioning. Nine times out of 10, their placing suffers. I can't stress enough how critical proper conditioning is in today's bodybuilding world. A perfect example to illustrate what I'm talking about with regard to measurements was my client Bill Wilmore. An issue Bill had faced is that his arms were not quite proportionate to his enormous back and chest. In the past, his arms would measure 21 inches in the off-season, and would be at 20 inches onstage. Bill's off-season goal

HOW I PUT AN OFF-SEASON PROGRAM TOGETHER

When a client comes to me with the interest of putting an off-season plan together to make specific improvements, what I do is similar to the concept of "reverse engineering." I go over everything they have been doing so far to find out what areas might be lacking or in need of improvement. These can be as diverse as not taking in enough calories, taking in too many or not getting enough specific nutrients, supplementation issues or facets of the training program that aren't delivering results. The athlete may not be doing certain exercises that he should be, or perhaps his form is off on key exercises. Rather than reinvent the wheel and start from scratch, I like to figure out what has and has not been working, and deal with things accordingly from there. Each program is custom-tailored to the individual and his or her needs. The next step is making minor adjustments and then gauging the results that follow. If you went in and changed everything all at once, there would be no way to tell what's working and what isn't. Instead, it makes a lot more sense to change just one aspect of the program at a time, and give it two to four weeks before assessing its effectiveness or lack thereof. At that point, additional changes are made and the process continues. ■

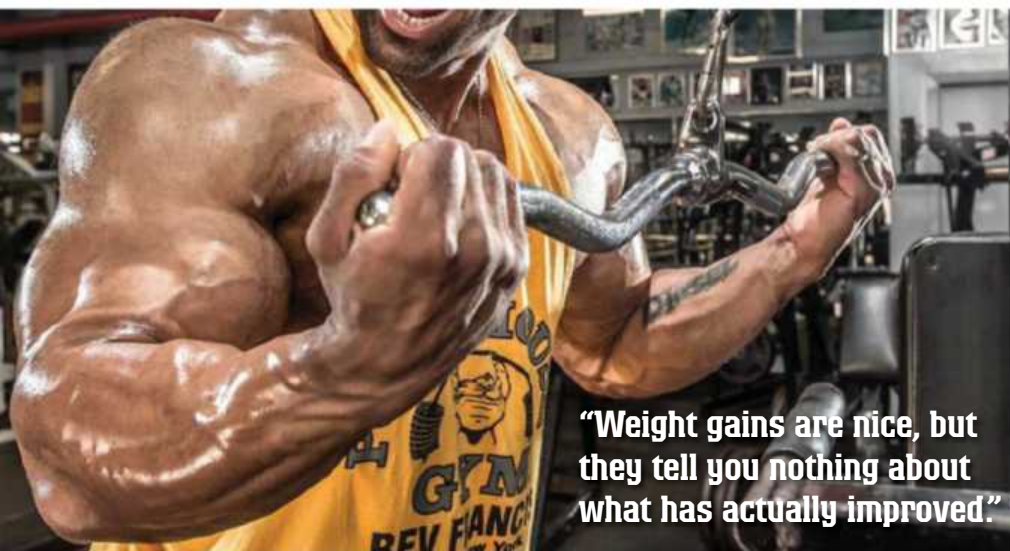
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Got a question for Hany Rambod? You can ask him directly on the MD website and have Hany personally answer your question! Go to www.musculardevelopment.com, MD Forums, MD Staff and Pros, Q and A for Hany Rambod.



"Weight gains are nice, but they tell you nothing about what has actually improved."

DETERMINING PROGRESS

One major issue that comes up with regard to a successful off-season program is how you measure your progress. The key word here is measure, in most cases. For example, an 18-inch arm is going to look bigger than a 17-inch arm. So if you have determined that your arms are weak in proportion to the rest of your torso, they need to have a larger measurement at the end of your off-season. This is how I prefer to quantify improvements, rather than what most

became to increase the off-season measurement to 22 inches, so his arms could be 21 inches the next time he competed. If he indiscriminately added 10 pounds of muscle and it went to his chest and back, while his arms remained the same size, his overall look would be more imbalanced. This is why not only is it important to evaluate exactly what needs to grow, but to have a reliable means to assess that it has indeed grown. Otherwise, you simply become a bigger version of the same physique.

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Overall	135 lbs	135 lbs	135 lbs
Strength	27.7 lbs	27.7 lbs	27.7 lbs
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Overall	135 lbs	135 lbs	135 lbs

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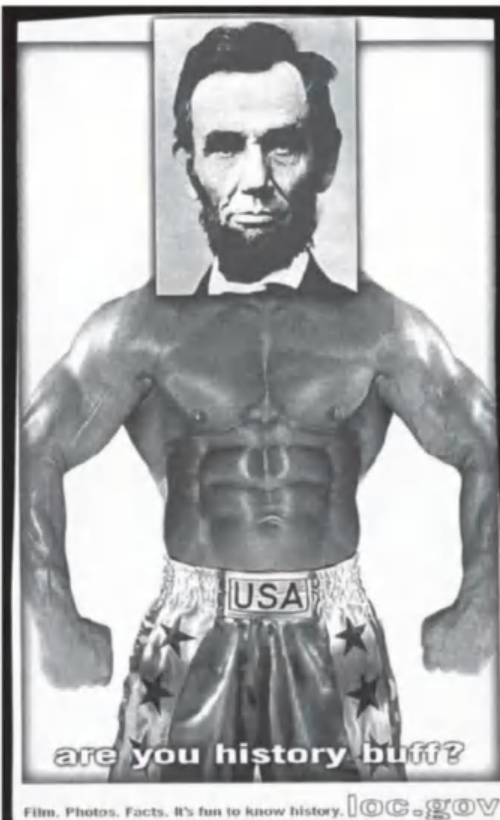
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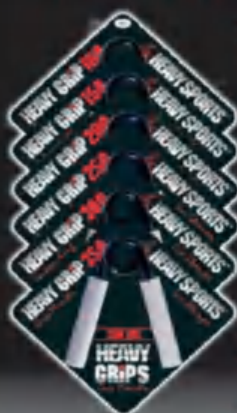
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AMOUNTS PER SUGGESTED SERVING					
PREWORKOUT	400mg	6g	5g	2.5g	2g
COMPETITIVE BRAND #1	DU-PB	NONE	1g (as Creatine HCl)	DU-PB	1.6g
COMPETITIVE BRAND #2	DU-PB	NONE	DU-PB	DU-PB	NONE
COMPETITIVE BRAND #3	DU-PB	DU-PB	DU-PB	DU-PB	DU-PB
COMPETITIVE BRAND #4	175mg	1.5g	3g	NONE	1.5g
COMPETITIVE BRAND #5	DU-PB	NONE	NONE	NONE	NONE
COMPETITIVE BRAND #6	190mg	NONE	NONE	NONE	1.5g
COMPETITIVE BRAND #7	DU-PB	NONE	NONE	NONE	2g
COMPETITIVE BRAND #8	350mg	6g	2g (as Creatine HCl)	NONE	1.6g

DU-PB = Dosage Unavailable, Proprietary Blend
 = Highest Dosage

A Comparison of the Top 3 Proven Post-Workout Nutrients

	L-Leucine	Creatine Monohydrate	Betaine
AMOUNTS PER SUGGESTED SERVING			
POSTWORKOUT	4g	5g	2.5g
COMPETITIVE BRAND #1	DU-PB	NONE	NONE
COMPETITIVE BRAND #2	2.5g	NONE	NONE
COMPETITIVE BRAND #3	DU-PB	NONE	NONE
COMPETITIVE BRAND #4	DU-PB	NONE	NONE
COMPETITIVE BRAND #5	2.5g	NONE	NONE
COMPETITIVE BRAND #6	2g	NONE	1.25g
COMPETITIVE BRAND #7	DU-PB	NONE	NONE
COMPETITIVE BRAND #8	3.6g	2g (as Creatine HCl)	1.5g

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